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OHIO STATE UNIVERSITY
BULLETIN

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GRADUATE SCHOOL

1940 - 1941

PUBLISHED BY THE UNIVERSITY AT COLUMBUS

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GRADUATE SCHOOL

1940 - 1941

THE OHIO STATE UNIVERSITY
COLUMBUS

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UNIVERSITY CALENDAR

1940

SUMMER QUARTER

June 17 to 24	Physical Examinations for all new students.
June 17	Latest day for registration and payment of fees without penalty. (See page 16.)
June 18	Classes begin, 7:30 A.M.
June 22	Intelligence Test for all new students (Saturday P.M.).
July 4	Independence Day. No classes.
July 22, 23, 24	Final Examinations, first term (at regular class hours).
July 24	First term ends, 5:30 P.M.
July 25	Second term begins, 7:30 A.M.
July 27	Intelligence Test for all new students (Saturday P.M.).
August 28, 29, 30	Final Examinations (at regular class hours).
August 30	Summer Convocation (Commencement), 2:00 P.M.
August 30	Summer Quarter ends, 6:00 P.M.

AUTUMN QUARTER

September 25 to 30	Freshman Week.
September 30	Physical Examinations for students other than Freshmen.
September 30	Latest day for registration and payment of fees without penalty. (See page 16.)
October 1	Classes begin, 8:00 A.M.
October 5	Intelligence Test for all new students other than Freshmen (Saturday A. M.).
November 11	Armistice Day. No classes.
November 21, 22, 23	Thanksgiving Recess.
December 17, 18, 19, 20, 21	Final Examinations.
December 20	Autumn Convocation (Commencement), 2:00 P.M.
December 21	Autumn Quarter ends, 6:00 P.M.

1941

WINTER QUARTER

January 2 to 6	Physical Examinations for all new students.
January 2	Latest day for registration and payment of fees without penalty. (See page 16.)
January 3	Classes begin, 8:00 A.M.
January 4	Intelligence Test for all new students (Saturday A.M.).
February 22	Washington's Birthday. No classes.
March 18, 19, 20, 21, 22	Final Examinations.
March 21	Winter Convocation (Commencement), 2:00 P.M.
March 22	Winter Quarter ends, 6:00 P.M.

SPRING QUARTER

March 31	Latest day for registration and payment of fees without penalty. (See page 16.)
April 1	Classes begin, 8:00 A.M.
March 31 to April 2	Physical Examinations for all new students.
April 5	Intelligence Test for all new students (Saturday A.M.).
May 28	R.O.T.C. Review and Presentation of Commissions.
May 30	Memorial Day. No classes.
June 10, 11, 12, 13, 14	Final Examinations.
June 14	Alumni Day.
June 15	Baccalaureate Sermon.
June 16	Class Day.
June 16	Spring Convocation (Commencement).
June 16	Spring Quarter ends.
June 23	Summer Quarter (1941) begins.
August 29	Summer Quarter (1941) ends.
September 30	Autumn Quarter (1941) classes begin.

ADMINISTRATION

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LOCKWOOD THOMPSON.....Cleveland
BURRELL RUSSELL.....New Philadelphia
CLINTON J. ALTMAIER.....Marion
CARLTON S. DARGUSCH.....Columbus
LEO L. RUMMELL.....Columbus

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Office: Administration Building—UN-3148; Campus 312
Residence: Ohio State University Campus—UN-3148; Campus 274

President Emeritus.....GEORGE W. RIGHTMIRE
Residence: 1445 E. Broad St.—EV-3042

President Emeritus.....WILLIAM McPHERSON
Residence: 198 16th Ave.—WA-1579

Secretary of the Board of Trustees, Bursar, and Business Manager.....CARL E. STEEB
Office: Administration Building—UN-3148; Campus 332
Residence: 198 W. 11th Ave.—UN-4782

Vice President.....JAMES LEWIS MORRILL
Office: Administration Building—UN-3148; Campus 628
Residence: 459 W. 8th Ave.—UN-9427

Registrar, University Editor, Secretary of the University Faculty, and Alumni Recorder.....EDITH D. COCKINS
Office: Administration Building—UN-3148; Campus 314, 459
Residence: 1580 Guilford Rd., Upper Arlington—KI-2726

University Examiner.....BLAND L. STRADLEY
Offices: 102 Administration Building—UN-3148; Campus 412, 368, 369
107 University Hall—UN-3148; Campus 341, 342
Residence: Canal Winchester—Canal Winchester Ex. 71

Executive Clerk.....KATHERINE A. VOGEL
Office: Administration Building—UN-3148; Campus 312
Residence: 1040 Elmwood Ave.—KI-5883

Comptroller.....CHARLES A. KUNTZ
Office: Administration Building—UN-3148; Campus 332
Residence: 265 E. Tulane Rd.—LA-3606

Cashier.....FLORIS D. HANE
Office: Administration Building—UN-3148; Campus 372
Residence: 373 13th Ave.—WA-1054

Dean of Men.....JOSEPH A. PARK
Office 111 Administration Building—UN-3148; Campus 288
Residence: 1474 Doone Rd., Upper Arlington—KI-1702

Dean of Women.....ESTHER ALLEN GAW
Office: 215 Pomerene Hall—UN-3148; Campus 480
Residence: 60 Jefferson Ave.—MA-1426

House Superintendent, Residence Halls.....EMMA E. PROUT
Office: Oxley Hall—UN-3148; Campus 346
Residence: Mack Hall—UN-3148; Campus 264

THE GRADUATE SCHOOL

Dean.....ALPHEUS W. SMITH

Office: 106 University Hall—UN-3148; Campus 466
Residence: 232 16th Ave.—WA-1924

Dean Emeritus.....WILLIAM McPHERSON

Office: 316 Chemistry Building—UN-3148; Campus 414
Residence: 198 16th Ave.—WA-1579

Secretary.....ALICE A. MORAN

Office: 106 University Hall—UN-3148; Campus 466
Residence: 987 Woodhill Drive—KI-6048

THE GRADUATE COUNCIL
1939-1940

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FREDERIC R. BAMFORTH, Ph.D., Associate Professor of Mathematics
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EDISON L. BOWERS, Ph.D., Associate Professor of Economics
WALLACE W. CHARTERS, Ph.D., LL.D., Director of the Bureau of Educational Research
GEORGE M. CURTIS, Ph.D., M.D., Professor of Surgery and Chairman of Research Surgery
HARVEY H. DAVIS, Ph.D., Professor and Chairman of the Department of Education
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DAN H. EIKENBERRY, Ph.D., Professor of Education
WILLIAM L. EVANS, Ph.D., Professor and Chairman of the Department of Chemistry
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EMMERICH VON HAAM, M.D., Professor and Chairman of the Department of Pathology
CHARLES H. HANDSCHIN, Ph.D., Professor of German, Representing Miami University
HARLAN HATCHER, Ph.D., Professor of English
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WILLIAM S. HENDRIX, Ph.D., Professor and Chairman of the Department of Romance Languages
HENRY E. HOAGLAND, Ph.D., Professor of Business Organization
N. PAUL HUDSON, Ph.D., M.D., Professor and Chairman of the Department of Bacteriology
H. GORDON HULLFISH, Ph.D., Professor of Education
HERRICK L. JOHNSTON, Ph.D., Professor of Chemistry
ROBERT M. KING, M.Sc., Associate Professor of Ceramic Engineering
JOHN F. LYMAN, Ph.D., Professor of Agricultural Engineering
CHARLES E. MacQUIGG, E.M., Representing the Engineering Experiment Station
EARL N. MANCHESTER, B.A., University Librarian
BERNARD S. MEYER, Ph.D., Associate Professor of Botany
SAMUEL RENSHAW, Ph.D., Professor of Psychology
ROBERT M. SALTER, M.Sc., Representing the Ohio Agricultural Experiment Station
EDMUND M. SPIEKER, Ph.D., Professor of Geology
CHARLES C. STILLMAN, B.A., Professor and Director of the School of Social Administration
JOHN B. TITCHENER, Ph.D., Professor and Chairman of the Department of Classical Languages
EUGENE VAN CLEEF, Ph.D., Professor of Geography
JOHN YOUNGER, B.Sc. in Engr., Professor and Chairman of the Department of Industrial Engineering

ADMINISTRATIVE BOARD

ALPHEUS W. SMITH, Dean, *ex officio*
N. PAUL HUDSON, for four years
GEORGE M. CURTIS, for three years
WILLIAM L. EVANS, for two years
HARLAN HATCHER, for one year
GEORGE R. HAVENS, for one year
EUGENE VAN CLEEF, for one year
JOHN YOUNGER, for one year

FELLOWSHIPS AND SCHOLARSHIPS
1939 - 1940

UNIVERSITY FELLOWSHIPS

JOHN CUNNINGHAM SPARKS (Special Fellow).....Political Science
GLENN CARMER COUCH.....Botany
RAY EMERSON HEIKS.....Chemistry
JOHN FREDERIC MOORE.....English
HOWARD HAYES ROSTORFER.....Zoology

UNIVERSITY SCHOLARSHIPS

GEORGE ERIC BECHTOLT.....German
DAVID BUSSELL.....Economics
NEIL WOLVERTON CHAMBERLAIN.....Economics
TIEN HSI CHENG (Summer Quarter only).....Entomology
DAI HO CHUN.....Education
HOWARD CHURCH.....Fine Arts
JOHN THOMAS CLARKE.....Chemistry
STANLEY KNIGHT COFFMAN, JR.....English
HELEN LOUISE CULBERTSON.....Mathematics
ALDEN DENZEL CUTSHALL.....Geography
HAZEL MERRILLA DAVIS.....Classical Languages
SARAH E. MARTIN EASON.....Romance Languages
LEROY CRAIG FERGUSON.....Political Science
ROBERT RICHARD FINK.....Fine Arts
JAMES A. GROSSMAN.....Botany
LOWELL WILLIAM HERRON.....Business Organization
EVERETT HARRINGTON HURLBURT.....Physics
GLENN ARTHUR LOWERY.....Economics
VIRGINIA JANE McALLISTER.....Fine Arts
HOWARD McDONALD.....Entomology
WILLIAM J. MIDDLETON.....English
HERMAN J. REITZ.....Horticulture
SLOAN DAVIS ROBERTSON.....Electrical Engineering
WILLIAM ULRICH SNYDER.....Psychology
SUE D. SPARKS.....Entomology
JOSEPH WARD STRALEY.....Physics
ISAAC THUT.....Education
SHIRLEY ANN TICE.....Romance Languages
STANLEY TALBOTT VANDERSALL.....Classical Languages
DOROTHY ELLEN WILSON.....Fine Arts
PAUL RUSSELL WEIDNER.....English
ATHERTON M. WHALEY.....Chemistry

THE ELIZABETH CLAY HOWALD SCHOLARSHIP

MELVIN SPENCER NEWMAN.....Chemistry

THE MARY S. MUELLHAUPT SCHOLARSHIPS

EDWARD ARTHUR STEINHAUS.....Bacteriology
HERMAN VON DACH.....Zoology
LEONARD RICHARD WILSON.....Botany

THE STILLMAN W. ROBINSON FELLOWSHIP

CHARLES TYRRELL WEST.....Civil Engineering

THE NATHANIEL WRIGHT LORD FELLOWSHIP

LLOYD G. EVANS.....Metallurgy

THE JOHN A. BOWNOCKER FELLOWSHIP

GEORGE CARLYLE MARTIN, JR.....Geology

THE JOHN A. BOWNOCKER SCHOLARSHIPS

JOHN JOSEPH CLARENCE GRAHAM.....Geology
RUSSELL FLORENTINE KAISER.....Geology
HELMUTH WEDOW, JR.....Geology

THE BATTELLE MEMORIAL INSTITUTE FELLOWSHIPS

CARL ROSS BLOOMQUIST.....Chemistry
ANDERSON PACE, JR.....Chemistry
EDWIN M. SHERWOOD.....Physics
MURRAY COWLEY UDY.....Metallurgy

ROSES, INCORPORATED FELLOWSHIP

RAYMOND FRANCIS HASEK.....Horticulture

THE EASTMAN KODAK COMPANY FELLOWSHIP

EMIL GABRIEL WIEST.....Chemistry

AMERICAN CHEMICAL PAINT COMPANY FELLOWSHIP

JOHN C. SWARTLEY.....Horticulture

JANSKY AND BAILEY FELLOWSHIP

LA VERNE MAYNARD POAST.....Electrical Engineering

NATIONAL ALUMINATE COMPANY FELLOWSHIP

JOHN ELBERT BARKLEY.....Chemistry

PROCTER AND GAMBLE COMPANY FELLOWSHIP

ROBERT LEWIS GRIFFITH.....Chemistry

E. I. duPONT de NEMOURS AND COMPANY FELLOWSHIP

RAYMOND A. BOURNIQUE.....Chemistry

PHI KAPPA PHI FELLOWSHIP

DAVID R. PERYHAM.....Psychology

CONSOLIDATED ROYAL CHEMICAL CORPORATION FELLOWSHIP

CHESTER J. CAVALITTO.....Physiological Chemistry

EDWARD ORTON JUNIOR CERAMIC FOUNDATION FELLOWSHIP

JO MORGAN TEAGUE, JR.....Ceramic Engineering

LENA LAKE FORREST FELLOWSHIP

MARY MARGARET AIKIN.....Psychology

WILLIAM S. MERRELL COMPANY FELLOWSHIP

THOMAS W. GREEN.....Bacteriology

AMERICAN PETROLEUM INSTITUTE RESEARCH FOUNDATION FELLOWSHIPS

JOHN MANN BUTLER.....Chemistry
GRANT CRANE.....Chemistry
MAYNARD STANLEY RAASCH.....Chemistry
AMOS TURK.....Chemistry

CHARLES A. COFFIN FELLOWSHIP

WILLIAM JOHNSON TAYLOR.....Chemistry

UNIVIS FELLOWSHIP

JOHN CLAIRE KEHOE.....Physics (Physiological Optics)

WHITE-HAINES FELLOWSHIP

HENRY W. HOFSTETTER.....Physics (Physiological Optics)

E. I. duPONT de NEMOURS AND COMPANY FELLOWSHIP (POST-DOCTORATE)

EDWARD A. METCALF.....Chemistry

ATLAS POWDER COMPANY FELLOWSHIP (POST-DOCTORATE)

MOSES KONIGSBERG.....Chemistry

MRS. CHARLES B. MANNING SCHOLARSHIP

ARCHIE CLARK WALLACE DALTON.....Social Administration

FRANKLIN H. PATTERSON MEMORIAL SCHOLARSHIP

WILLIAM HOWARD IRELAND.....Social Administration

FREDERICK HILLIS LUMLEY FOUNDATION FELLOWSHIP

SAMUEL V. BENNETT.....Psychology

C. C. STILLMAN SCHOLARSHIP

MARVIN HOFFENBERG.....Social Administration

M. R. BISSELL, JR., SCHOLARSHIP

ZELLER RUSSELL HENRY.....Social Administration

JULIUS F. STONE FELLOWSHIP (POST-DOCTORATE)

NORMAN O. CAPPEL.....Chemistry

SCHOOL OF SOCIAL ADMINISTRATION ASSOCIATES, INCORPORATED, SCHOLARSHIP

RICHARD ALLEN HANEY.....Social Administration

THE OHIO STATE UNIVERSITY

LOCATION

The Ohio State University is situated within the corporate limits of the city of Columbus. It is supported by appropriations from the State and Federal government. The University has almost 1,400 acres of land with nearly 400 acres in the campus. The total value of land, buildings, and equipment is $24,665,186.14.

ORGANIZATION

For convenience of administration the departments of the University are grouped into organizations called Colleges. The Ohio State University comprises ten Colleges and a Graduate School, each under the administration of a Dean and College Faculty, as follows:

Graduate School, College of Agriculture (including the School of Home Economics), College of Arts and Sciences (including the School of Journalism and the School of Optometry), College of Commerce and Administration (including the School of Social Administration), College of Dentistry, College of Education, College of Engineering (including the School of Mineral Industries), College of Law, College of Medicine (including the School of Nursing), College of Pharmacy, College of Veterinary Medicine.

NOTE: Bulletins describing the work of the several Colleges may be obtained by addressing the University Examiner, The Ohio State University, Columbus, and stating the College in which the writer is interested. (For list of bulletins, see the last page.)

THE UNIVERSITY YEAR—FOUR QUARTERS

The University year is divided into four Quarters, each approximately eleven weeks in length. The Summer Quarter is further divided into two terms of approximately six weeks each. Complete courses that are so announced may be taken for either term or for the entire Quarter.

This *Bulletin* is devoted to the work of the Graduate School for the Autumn, Winter, and Spring Quarters, 1940-1941. The announcements for the Summer Quarter are printed in the Summer Quarter Bulletin.

THE GRADUATE SCHOOL

GENERAL INFORMATION

The office of the Graduate School is located in Room 106, University Hall, (the large building with the clock in the tower). The office is open from 8:00 A. M. to 12:00 and 1:00 to 5:00 P. M. daily, except Saturday. On Saturday, it is open from 8:00 A. M. to 12:00 M.

The offices of the President of the University, the University Examiner, the Registrar, and the Bursar are located in the Administration Building.

ORGANIZATION AND ADMINISTRATION

The instruction and training of graduate students has been one of the functions of The Ohio State University since 1878, when the first graduate student was in residence. For a number of years the graduate work of the University was unorganized and each department conducted its own work with little reference to that of other departments. After the University was divided into colleges, each college controlled the graduate work offered in the various departments constituting that college. In 1902, however, the graduate work

within the College of Arts had assumed sufficient proportions to warrant the organization of a Graduate School to secure an effective and systematic arrangement of the graduate work of that college. Finally in 1911, there was organized the Graduate School of the University to administer all the graduate work offered in the several departments of the University. This School is under the administration of a Graduate Council consisting of thirty-three members. The membership of the Council is made up of the following: the Dean of the Graduate School, the Director of the Bureau of Educational Research, the Director of the Bureau of Business Research, the Director of the Engineering Experiment Station, a representative of the Ohio Agricultural Experiment Station, the University Librarian, twenty-six members of the instructional staff appointed from among those departments offering graduate work in The Ohio State University, and a representative from the faculty of Miami University. This council reports directly to the University Faculty, which is the legislative body of the Graduate School, as well as of the ten colleges.

All communications and inquiries regarding matters connected with the Graduate School, whether from prospective students or from those whose work is in progress, should be directed to the Dean of the Graduate School.

AGREEMENTS BETWEEN THE OHIO STATE UNIVERSITY AND OTHER INSTITUTIONS CONCERNING GRADUATE WORK

In order that certain educational and research institutions may be able to take advantage of the facilities of the Graduate School, and also in order that these institutions may be utilized for the pursuit of research work in connection with the Graduate School, agreements have been made between the Board of Trustees of The Ohio State University and the following institutions:

(a) **With Miami University.** Miami University is represented upon the Graduate Council of The Ohio State University. Part-time assistants connected with the instructional staff of Miami University may pursue their graduate work for the Master's degree at Miami University subject to the supervision of the Graduate Council of The Ohio State University, and upon the successful completion of the same will receive their degrees from The Ohio State University. Such students must be registered in the Graduate School of the Ohio State University while pursuing their work.

(b) **With the Ohio Agricultural Experiment Station.** Persons engaged in investigation at the Ohio Agricultural Experiment Station may register in the Graduate School of the University and the research work carried on at the Station by such persons may be counted towards a graduate degree under appropriate restrictions. All such cases, however, shall be considered individual and subject to detailed examination on the part of the Graduate Council. It is possible for a student to complete his work for the Master's degree in residence at the Station alone. For the Doctor's degree he must spend at least one year in residence at The Ohio State University. In all cases, however, the work of the students is carried on under the general rules and regulations of the Graduate Council and the final examinations must be taken at the University in the presence of representatives of the Experiment Station Staff and of the Graduate Council.

(c) **With the Merrill-Palmer School.** A graduate of The Ohio State University who has completed all the necessary undergraduate requirements may fulfill the residence requirement for the Master's degree by satisfactorily completing one Quarter of acceptable work in residence at The Ohio State University, and two additional Quarters of acceptable work in residence at the Merrill-Palmer School. Before entering the Merrill-Palmer School, the candidate must confer with the chairman of the department at The Ohio State University in which he wishes to specialize, under whose direction a general course of study for the Master's degree will be arranged. The thesis subject

must be of such character as to enable the candidate to carry on experimental work at the Merrill-Palmer School.

The final examination of the candidate will be conducted by a committee consisting of members of the instructional staff of this University together with representatives of the Merrill-Palmer School, according to the rules governing the Master's degree. The thesis must meet with the approval of both the Merrill-Palmer School and this University.

Students carrying on work at the Merrill-Palmer School under the above regulations must also register at the same time in the Graduate School of this University, but will not be required to pay fees in this University.

(d) **The Perkins Observatory.** The Perkins Observatory is jointly maintained and administered by the Ohio Wesleyan University and the Ohio State University. Its facilities are, therefore, available for students registered in the Graduate School desiring to pursue research work in astronomy or astrophysics.

The principal instrument of the Observatory is a large reflecting telescope, the mirror for which was cast by the Bureau of Standards and is the first large piece of optical glass made in this country. The reflecting surface measures 69 inches in diameter and offers an unusual equipment for astronomical and astrophysical research. There is an auxiliary photographic doublet for six-inch aperture, and a solar objective of 25 feet focal length.

The Observatory is being provided with auxiliary scientific equipment which will afford special facilities for photometric, spectroscopic, and radiometric investigations.

The main building houses the offices for the staff, a lecture room, a spacious library, research laboratory, photographic dark rooms, and an instrument shop for the construction of special apparatus.

Members of the scientific staff of the Observatory are also members of the staff of the Department of Physics and Astronomy. The facilities of the Mendenhall Laboratory of Physics and the Emerson McMillin Observatory are available as far as possible to supplement the facilities of the Perkins Observatory, and the staff of the Mendenhall Laboratory of Physics cooperates fully with the staff of the Observatory in the supervision and direction of research. Unusual opportunities are thus offered for graduate and research work in astronomy and astrophysics.

(e) **With the Bureau of Juvenile Research of the State of Ohio.** Students who are registered in the Graduate School of The Ohio State University and who are candidates for a Master's degree, specializing in Clinical Psychology, may do not to exceed one-third of the work required for this degree at the Bureau of Juvenile Research. All such work must be approved in advance by a professional member of the Clinical Division of the Department of Psychology, and all credits received for such work must be submitted under his signature.

Candidates for the degree of Doctor of Philosophy specializing in Clinical Psychology, may likewise carry on work at the Bureau of Juvenile Research. The amount of such work shall be determined in each individual case by a professional member of the Division of Clinical Psychology of the Department of Psychology and the Dean of the Graduate School, but in no case will this amount exceed one-third of the total requirements for the degree of Doctor of Philosophy.

Students carrying work at the Bureau of Juvenile Research must be registered in the Graduate School of this University during the time in which they are pursuing such work.

The Bureau of Juvenile Research offers a limited number of full-time interneships for qualified graduate students majoring in clinical psychology.

(f) **With the Battelle Memorial Institute.** Students who are registered in the Graduate School of The Ohio State University, specializing in certain fields of engineering, especially in metallurgy, fuels and allied fields, may

carry on their research work at the Battelle Memorial Institute. The credit for such work must be submitted under the signature of the professor in charge of the work, who must be a member of the appropriate department of the University.

THE UNIVERSITY LIBRARY

The University Library consists of all books owned by the University and numbers over 532,000 volumes. The main part of the Library, which is known as the General Library, is housed in the Library Building. Very important divisions of the book collection are housed in other buildings. A catalog of the entire collection is maintained in the General Library.

Any person is privileged to use the University Library for reference, but books may be drawn for home use only by officers and registered students of the University. Graduate students may obtain a permit to use the stacks of the Library upon presentation of their fee cards at the office of the Librarian.

The University Library is a depository for the official publications of the United States and has a very complete collection of these documents. It also receives thousands of documents from states, cities, and foreign countries. The Library also possesses the British Parliamentary Papers including the rare early volumes. The numerous series of the publications of the League of Nations are well represented in the Library Collections. The exchanges of the Ohio Academy of Science, of the Ohio State University Scientific Association and of the Ohio Biological Survey are deposited in the University Library.

Through a gift from the Phi Eta Sigma fraternity, the General Library has established a rental library of significant current books for general reading. Its popularity suggests that this project fills a recognized need.

The University Library is a depository for the Library of Congress catalog.

Thirteen department libraries, organized divisions of the University Library, are in charge of library assistants.

The Botany and Zoology Library is located in the Botany and Zoology Building. The "Index to General Botanical Literature," the "Index to Algological Literature" and the card index to the Concilium Bibliographicum are in this departmental library.

Brown Hall Library, located in Brown Hall, contains collections of books on Architecture, Engineering Drawing, and Civil Engineering. The collection of plates filed in this library is especially valuable for students in Architecture.

The Charles Cutler Sharp Library is located in the Chemistry Building. It contains not only the current periodicals and a large collection of dictionaries and handbooks on chemistry, but also complete sets of all important journals dealing with subjects lying within the general field of chemistry and related sciences.

The Commerce Library, in the Commerce Building, includes a working collection of books for the undergraduate students in the College of Commerce. A large study room is maintained and also a reserve collection for student use.

The Education Library is located in Arps Hall. It is organized for graduate work and includes complete sets of important educational and psychological periodicals, city and state reports, textbooks, and other works of reference on educational and psychological subjects.

The Law Library is in Page Hall. It includes all of the United States and state reports, the English reports, the Irish reports, the latest statutes, codes and session laws of the states, complete sets of all the important legal periodicals and an up-to-date collection of text-books. It is especially well equipped for the study of Ohio law.

The Lord Hall Library consists of collections of books on Ceramics, Mining, Metallurgy, and Mineralogy and is located in Lord Hall.

The Medical and Dental Library is in Hamilton Hall. It consists of a working collection of books and periodicals. The historical books and many of the foreign periodical sets are shelved in the General Library.

The Orton Memorial Library, located in Orton Hall, is one of the finest geological libraries in the country. In addition, the Ohio Geological Survey deposits its document exchanges with the library. These two collections constitute a very complete set of official geological reports from the states, foreign governments, and scientific societies.

The Pharmacy-Bacteriology Library is located on the first floor of the Pharmacy and Bacteriology Building. It comprises files of journals and selected titles in pharmacy and bacteriology designed to furnish a reference collection for the students in these departments.

The Alfred D. Cole Memorial Library of Physics occupies two rooms in the Mendenhall Laboratory of Physics. The nucleus of the collection is the private library of Professor Cole, supplemented by files of journals and selected titles in the field of physics, transferred to this collection from the General Library. A memorial endowment fund contributed by friends of Professor Cole will ultimately provide for additions to this Library. The books and journals in the field of mathematics are shelved at present in the Cole Memorial Library rooms for the mutual convenience of the two departments.

The Social Administration Library is located on the fourth floor of the Social Administration Building and was opened for use with the Spring Quarter, 1938. The library consists of texts, journals, serials, and particularly reports of Social Welfare Agencies selected from the University Collections and located in the Social Administration Library for the convenience of students and faculty in this field.

The Library of the College of Veterinary Medicine, located in the Veterinary Laboratory, contains approximately 2,000 volumes in this field, exclusive of a large collection of bulletins, reports, reprints, and other unbound and uncatalogued material.

Smaller collections selected with special reference to the needs of the various departments are housed near their offices. Collections of this type have been developed for Political Science, Room 100, University Hall, and Journalism on the second floor of the Journalism Building. The books relating to the Department of Fine Arts are collected in the Mantel Room in the General Library, where students have every facility for research.

The Library of the Ohio Archaeological and Historical Society, which is on the University Campus, is at the service of the officers and students of the University. This library is specializing in the history of Ohio and the Northwest and a very valuable collection is being built up. Its large newspaper collection is one of the most valuable in the Middle West.

The special library of Battelle Memorial Institute and the collections of the State Library are open to faculty and students of the University and supplement in important fields the collections of the University Libraries.

THE STATE LIBRARY

The State Library, consisting of approximately 600,000 volumes, is also available and is especially valuable in certain lines of work.

TEACHERS' PLACEMENT SERVICE

The Ohio State University maintains a Teachers' Placement Service for the convenience of the superintendents and boards of education of the State. Graduates and graduate students of the University are invited to enroll with the Appointments Office.

The Placement Service is under the direction of the Bureau of Educational Research. This service is rendered free of charge to the applicants. Graduates of experience who desire to better their locations are invited to communicate with the Appointments Office.

The Appointments Office has available such statistical information that

advice and direction may be given in the matter of supply and demand for teachers in various fields.

Superintendents and boards of education are invited to state their needs to the Appointments Office. Prompt attention to all calls is assured.

GRADUATE STUDENT LOANS

A limited amount of money is available for loans to graduate students upon application to the Dean of Women or the Dean of Men. Loans are made only to those students who have been in residence in The Ohio State University for at least one Quarter. The maximum amount loaned in any one year to an individual is $100.00.

Phi Delta Gamma, graduate women's sorority, has available a loan fund for graduate women. Applications must be made to the President of Phi Delta Gamma.

UNIVERSITY HEALTH SERVICE
Hayes Hall

Medical Staff: Dr. J. W. Wilce, Director; Dr. M. F. Osburn, Dr. J. M. Foley, Dr. James A. Beer, Dr. Shirley Armstrong, Dr. Charlotte Winnemore, Dr. Theodore Allenbach, four occasional clinical and examination assistants, eight specialized occasional consultants, four nurses, and one technician.

Office Hours. When the University is in session, daily 8:30 to 12:00 and 1:00 to 4:30; Saturdays, 8:30 to 12:00. Limited service, 12:00 to 1:00.

The objects of the University Health Service are:

(1) To protect, maintain, and improve the health of students by cooperation in entrance examination; early diagnosis and control of all contagious conditions, in cooperation with other health agencies; individual health guidance, through personal conference; first aid and casual treatment of students on the campus; periodic health examinations for seniors, food-handlers, and special cases; consultant specialist service for certain cases; full cooperation with family physician, other physicians, and health agencies; centralized correlation of health agencies on the campus to best educational personnel ends; maintained emphasis on individual and group preventive medicine.

(2) To serve as the primary coordinating agency with University Personnel officials in individual student health appraisal and health problems which involve the maintenance, discontinuance, or improvement of students' university relationships.

(3) To furnish a limited degree of hospitalization for observation, diagnosis, or treatment of emergency conditions, when in the judgment of University Health Service physicians it is thought necessary. (Responsibility for special hospital treatment is not assumed by the University Health Service.)

STUDENT AUTOMOBILES

The University does not bar the use of automobiles by students. However, students can be given only very limited parking space on the campus, and the use of autos is discouraged. Unless the student drives a long distance to and from his home each day or is physically incapacitated, he does not need a car while attending the University. The cooperation of parents in this matter is earnestly desired.

Every student driving a car on the campus should register the car at the beginning of each Quarter at the Information Desk in the Administration Building. Any student who fails to register his car will be given a *double penalty* when cited to the traffic court for violation of the University rule. Registration of the car entitles the student to park *only* in areas set aside for student parking.

FEES AND EXPENSES

Registration is not complete until all fees have been paid. No student will have any privileges in the classes or laboratories until all fees and deposits are paid, except under special procedure authorized by the President.

Graduate students must register and pay their fees not later than the end of the first week of the Quarter. All graduate students who have not paid their fees before 4 P. M. on Monday following the beginning of classes shall be assessed a penalty of $1.00 for each succeeding day or fraction thereof (with a maximum of $10.00) unless excused by the Registrar.

1. Matriculation fee (non-returnable)
   Required of every student on *first admission to the University* $15.00

2. Incidental fees
   Incidental fees do not vary with the number of courses taken
   Quarter fee for a resident of Ohio..... 20.00
   *Quarter fee, including non-resident fee, for a non-resident of Ohio 70.00

3. Special fees
   (a) General Activities fee..... 4.00
   (b) Laboratory Breakage deposit—amount varies with course.....from 1.00 to 20.00
   Students are required to pay for all materials consumed in laboratory work. The laboratory deposit must be made at the time of registration before the student may enter the laboratory. All laboratory supplies are sold to students at the Laboratory Supply Store, Chemistry Building, and charged against the deposit (See page 17). Instructors shall not permit students to engage in laboratory work unless the student has shown a receipt from the Bursar for deposit paid
   (c) Abstract fee
   The abstracts of Masters' theses and Ph.D. dissertations are published in the form of a journal at the end of each Quarter and a special fee for editing, printing, and binding these abstracts is required for each person receiving such a degree from this University. This fee must be paid not later than one week *before* the commencement date on which the candidate expects to receive his degree
   Abstracts of Masters' theses..... 5.00
   Abstracts of Ph.D. dissertations..... 50.00
   (d) Binding fee for theses and dissertations
   A special binding fee must be paid to the Bursar of the University not later than one week before the commencement date on which the candidate expects to receive his degree..... 2.50

NOTE: When checks given for payment of fees are not paid on presentation at bank, registration will be automatically cancelled and receipts given considered null and void.

*NON-RESIDENT FEE

Every student who is not a legal resident of the State of Ohio is required to pay a non-resident fee of $50.00 each Quarter (or $25.00 each term of the

Summer Quarter) of his residence in the University in addition to other University fees. The burden of registering under proper residence is placed upon the student. If there is any possible question of his right to legal residence the matter should be brought to the attention of the Registrar and passed upon, previous to registration or the payment of fees. Any student who registers improperly under this rule shall be required to pay not only the non-resident fee but shall be assessed a penalty of $10.00. Students who do not pay this fee within thirty days after they have been notified that the non-resident fee has been assessed against them, will have their registration in the University cancelled.

No person shall be considered eligible to register in the University as a resident of the State of Ohio unless he has been a *bona fide* resident in the State twelve consecutive months next preceding the date of his *original enrollment*, and no person shall be considered to have gained or lost a residence in this State for the purpose of registering in the University by any conduct of his own while he is a student in the University, unless after attendance at the University for one year it can be clearly established by the student that his previous legal residence has been abandoned and a new one established in Ohio for purposes other than merely attending the University; but persons whose legal residence follows that of other persons, as hereinafter provided, shall be considered to have gained or lost legal residence in this State for such purpose while students in the University according to changes of legal residence of such other persons, except that such legal residence shall not be considered to be so gained until twelve months after such other person becomes a legal resident of this State.

MINORS: The residence of minors shall follow that of the legal guardian. regardless of emancipation; but in case a resident of Ohio is appointed guardian of a non-resident minor, the legal residence of such minor for the purpose of this rule shall not be considered to be established in the State of Ohio until the expiration of twelve months after such appointment.

WIVES: The residence of wives shall follow that of husbands.

ALIENS: Aliens who have taken out their first citizenship papers and who have been residents of Ohio for twelve months next preceding the date of their original enrollment in the University, shall be regarded as eligible for registration as residents of Ohio.

ROOM AND BOARD

Room and Board. (See Living Arrangements, page 23.)

RETURN OF FEES ON WITHDRAWAL

Fees are returnable in case a student withdraws on account of sickness or for other causes entirely beyond his control, if such withdrawal is made during the first thirty days of the Quarter. Students withdrawing under request from the University are not entitled to any return of fees. Permission to withdraw, given in writing by the Dean of the College, must be presented to the Bursar within this thirty-day period. Ordinarily no more than one-half of the fees paid will be refunded; if the case has exceptional circumstances it should be referred to the President for his judgment.

No fees will be returned in case of withdrawal of students until thirty days have elapsed from the date of withdrawal.

If fees are paid under mistake of law or fact they are returnable in full.

Fees are not returnable except as provided in this rule.

On Laboratory Deposits. If a student is forced to withdraw from a laboratory course during a Quarter, he must first secure permission from his Dean.

No portion of a laboratory deposit of $5.00 or less shall be returned, unless the course is officially dropped by the student and request for refund presented within thirty days after the payment of the deposit.

On a laboratory deposit of $6.00 or more the unexpended part of the deposit is returnable if called for on or before the close of the Spring Quarter of the fiscal year in which the deposit has been made.

An order for refund for the unexpended portion of the deposit may be obtained by applying at the Laboratory Supply Store, Chemistry Building. The unexpended part of the deposit will be paid at the Bursar's Office on presentation of the order for refund.

SPECIAL FEE—PENALTY

PENALTY FOR FAILURE TO KEEP APPOINTMENT FOR PHYSICAL EXAMINATION

A fee of $1.00 will be assessed for failure to keep appointment for Physical Examination or for change in date of Physical Examination.

STUDENT PERSONAL EXPENSE FUNDS

The incoming student will save himself much time and trouble by taking a few simple precautions in regard to his personal expense money. The student should bring enough cash to cover all expenses for several days. If he does not wish to carry cash, he should use travellers checks, as they are readily cashed. If he does bring a check, it should be in the form of a bank draft or cashier's check. The student who has a check should not wait until he has spent all his money before cashing the check for it may take several days to collect it. Be sure that any checks that are for the payment of fees are drawn for the exact amount of the fees.

The following facts concerning the cashing of checks should be borne in mind by parents and prospective students.

(a) The Ohio State University does not cash checks.

(b) Checks for fees will be accepted by the University, but only when the check is drawn for the exact amount of the fees.

(c) Banks do not cash checks for strangers unless the check is endorsed by a customer of the bank or some person of known responsibility. This rule applies to cashier's checks, bank drafts, and certified checks.

The student who intends to use a checking account will find that an account in Columbus will be of more value than an account at home or in some other city. An account with a Columbus bank will provide a safe place for depositing funds, will help create a local credit standing, will furnish a means of depositing and cashing checks, and will help the student to understand banking practices.

ASSISTANTSHIPS, FELLOWSHIPS, AND SCHOLARSHIPS

GRADUATE ASSISTANTSHIPS OPEN TO GRADUATE STUDENTS

In order to encourage graduates of this University and of other similar and approved institutions, especially those in Ohio, to continue their studies and to pursue advanced work leading to the higher degrees, the University has established graduate assistantships in several departments. Graduate assistants must be registered in the Graduate School as candidates for a graduate degree. They are elected for the year—four Quarters. During three Quarters, generally the Autumn, Winter, and Spring Quarters, they must devote approximately one-third of their time to assisting in the work of the department in which they are specializing; during the remaining Quarter the graduate assistants are free to carry on their work at the University or elsewhere. Each graduate assistant must confer with the chairman of the department in which he is specializing concerning the Quarters that he must be in residence. A graduate assistant receives a stipend of $450, payable in nine monthly installments during the three Quarters in which he is rendering

service. In addition, all fees are remitted except a matriculation fee of $15.00. If a graduate degree is obtained, the assistant must pay a fee for editing and printing the abstract of his thesis or dissertation and for binding the thesis or dissertation ($7.50 in the case of the Master's degree and $52.50 in the case of the degree of Doctor of Philosophy).

Students desiring to apply for graduate assistantships in any academic year *must present their applications not later than March 1 of the preceding year.* Application blanks may be obtained upon request by addressing the chairman of the department in which the candidate desires to secure such an assistantship.

UNIVERSITY SCHOLARSHIPS AND FELLOWSHIPS

In addition to the graduate assistantships, a limited number of scholarships and fellowships have also been established. The scholarships are open to students having a baccalaureate degree from an approved institution, and have a value of $300 with exemption from all fees, except the matriculation fee of $15.00. The fellowships, on the other hand, are open only to students who have at least the Master's degree or its equivalent, and have a value of $500 with like exemption from all fees, except the matriculation fee. Fees for three Quarters for residents of Ohio amount to $72.00; for non-residents, the fees amount to $222 for three Quarters. If a graduate degree is obtained, a scholar or a fellow must pay a fee for editing and printing the abstract of his thesis or dissertation and for binding the thesis or dissertation ($7.50 in the case of the Master's degree and $52.50 in the case of the degree of Doctor of Philosophy). These awards are limited to applicants under thirty-five years of age.

Scholars and fellows are selected on a basis of merit, irrespective of the departments in which they wish to specialize, and must devote all their time to graduate work, including research. They are elected for the year, four Quarters, but are required to be in attendance only three Quarters, generally the Autumn, Winter, and Spring Quarters, during the year. Candidates for these positions for the year 1940-1941 must file their applications not later than February 15, 1940. Application blanks may be obtained by addressing the Dean of the Graduate School. Appointments are made annually on April 1 in accordance with the regulations of the Association of American Universities, of which Association the University is a member.

THE FREDERICK HILLIS LUMLEY MEMORIAL

Mr. and Mrs. Frederick E. Lumley, in memory of their son, have created the Frederick Hillis Lumley Memorial Fund in experimental and theoretical psychology. From the income of this fund a fellowship or scholarship in experimental or theoretical psychology will be created by the committee in charge of the fund; or at the discretion of this committee, the income from the fund may be spent for publication of work done at The Ohio State University in the fields mentioned above, or for such other aid in furthering important research in the field as the committee may approve.

ENDOWED FELLOWSHIPS

THE ELIZABETH CLAY HOWALD SCHOLARSHIP

This scholarship, endowed by the late Ferdinand Howald, an alumnus of The Ohio State University, in memory of his mother, Elizabeth Clay Howald, carries a stipend of $3000 payable in twelve monthly installments.

Any person who has shown marked ability in some field of study and has in progress work, the results of which promise to constitute important additions to our knowledge, shall be deemed eligible to appointment to this Scholarship.

The scholar will be expected to devote his time uninterruptedly to the pursuit of his investigations. If he has ever been a student of The Ohio State

University or a member of the University staff, he may carry on his investigations either at The Ohio State University or, subject to the approval of the Graduate Council, elsewhere either in this country or abroad where superior advantages for his particular field of study are available. If the scholar has never had any connection with The Ohio State University, however, then he must carry on his investigations at The Ohio State University.

Applications must be filed with the Dean of the Graduate School not later than March 1. The appointment will be made on April 1 and the term of appointment will begin July 1 and extend to July 1.

Prospective candidates may secure application blanks by addressing the Dean of the Graduate School.

THE STILLMAN W. ROBINSON FELLOWSHIP

The fellowship endowed by Stillman W. Robinson, late Professor of Mechanical Engineering, for the encouragement of graduate research in engineering, has an annual value of $750, and is open to graduates in Mechanical, Civil, and Electrical Engineering.

The holder of the fellowship must devote his entire time to graduate work. This should lead to the Master's or the Doctor's degree under the general regulations which obtain in reference to these degrees. For further information, or for application blanks, address the Dean of the Graduate School or the Secretary of the College of Engineering.

All applications should be filed with the Dean of the Graduate School not later than February 15.

THE NATHANIEL WRIGHT LORD FELLOWSHIP

The fellowship endowed by William Bartlett Calkins, an alumnus of the University, in memory of Nathaniel Wright Lord, late Professor of Metallurgy, has an annual value of $750. This fellowship was established to encourage graduate research on solid fuels or products derived from solid fuels which have a practical application in the industrial world.

The holder of the fellowship must devote his entire time to graduate work. This should lead to the degree of Master of Science or Doctor of Philosophy, under the general regulations which obtain in reference to these degrees. For further information or for application blanks address the Dean of the Graduate School.

All applications should be filed with the Dean of the Graduate School not later than February 15.

EDWARD ORTON JUNIOR CERAMIC FOUNDATION FELLOWSHIP

Under the provisions of the will of the late Edward Orton, Jr., the Edward Orton Junior Ceramic Foundation has established a fellowship having an annual value of $750. Of this amount $600 is the stipend of the Fellow and $150 is used for the purchase of apparatus and materials. The holders of these fellowships are expected to devote their entire time to graduate courses and research work in the field of ceramics under the general direction of the Department of Ceramic Engineering and ordinarily will be candidates for either the Master of Science or the Doctor of Philosophy degree.

THE JOHN A BOWNOCKER FELLOWSHIP AND SCHOLARSHIPS

A fellowship and one or more scholarships may be provided from funds bequeathed by John A. Bownocker, an alumnus of the University and late Professor of Geology. The fellowship has an annual value of $750 and a scholarship has an annual value of $450. Both Bownocker Fellowships and Scholarships carry the same exemption from fees as do the University Fellowships and Scholarships. (See page 19.) Applicants must have had at least one year of graduate work.

The holder of a John A. Bownocker Fellowship or Scholarship must register

in the Graduate School of The Ohio State University and must devote his entire time to graduate work and research in the field of geology. This should lead towards the degree of Doctor of Philosophy under the general regulations which obtain in reference to this degree. For further information, or for application blanks, address the Dean of the Graduate School.

All applications must be filed with the Dean of the Graduate School not later than March 1. Appoinments will be made April 1.

SPECIAL FELLOWSHIPS AND SCHOLARSHIPS

THE BATTELLE MEMORIAL INSTITUTE FELLOWSHIPS

The Battelle Memorial Institute of Columbus has established one or more fellowships at The Ohio State University. Each fellowship carries an honorarium of $60.00 a month for ten months, September to June inclusive. All course work selected by the fellow will be taken at The Ohio State University, while the research work will be carried on at The Battelle Memorial Institute. Inasmuch as this institute was founded for the purpose of studying the application of science to industries, especially in Metallurgy, Fuels and allied fields, the candidate's research work must be in this general field. Ordinarily each fellow will be a candidate either for the degree of Master of Science or Doctor of Philosophy, and will devote his entire time to graduate work, including research.

Candidates may secure application blanks by addressing the Dean of the Graduate School. All applications should be received not later than February 15 of each academic year.

THE MARGARET G. HARDER PAN-AMERICAN SCHOLARSHIP

In May, 1930, the Ohio Federation of Women's Clubs established a scholarship to be known as the Margaret G. Harder Pan-American Scholarship. This scholarship carries an honorarium of $800 payable in monthly installments, and in addition the holder of the scholarship is allowed the same exemption of fees as are the University Scholars and Fellows.

The scholarship is open to women graduates of reputable South American Colleges and Universities. For further information concerning this scholarship address Mrs. William N. Harder, 434 East Church Street, Marion, Ohio.

NATIONAL ALUMINATE CORPORATION FELLOWSHIP

The National Aluminate Corporation of Chicago, Illinois, has for several years maintained a fellowship in the Department of Chemistry for research on the behavior of steam boiler water. The annual value of this fellowship is $900, $750 of which has been used as the stipend of the Fellow and the remainder for special equipment. The holder of this Fellowship is allowed the same exemption from fees as are the University Fellows and Scholars. Candidates may secure application blanks by addressing the Dean of the Graduate School. Applications should be filed not later than March 1.

THE J. T. BAKER CHEMICAL COMPANY FELLOWSHIP

This Fellowship is devoted to fundamental research in Inorganic Analytical Chemistry. It is limited to institutions which grant the doctor's degree in chemistry in the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin, and is awarded annually to some institution which has been conducting research in Inorganic Analytical Chemistry. The stipend of the Fellow is $1000. The holder of this Fellowship is allowed the same exemption from fees as are the University Fellows and Scholars. Candidates may secure application blanks by addressing the Dean of the Graduate School. Applications should be filed not later than March 1. The Ohio State University was awarded this Fellowship in 1929 and in 1936.

THE PROCTER AND GAMBLE FELLOWSHIP

This Fellowship, established by the Procter and Gamble Company, has an annual value of $1000. This fellowship was established to encourage graduate work in the field of Chemical Engineering and is open to graduate students in the Department of Chemical Engineering. The holder of this Fellowship must devote his entire time to graduate work leading to the degree of Doctor of Philosophy. The holder of this Fellowship is allowed the same exemption from fees as are the University Fellows and Scholars. Candidates may secure application blanks by addressing the Dean of the Graduate School. Applications should be filed not later than March 1.

PURE HYDROCARBON RESEARCH FELLOWSHIPS

These Fellowships are made possible by a program of research on pure hydrocarbons supported by interested companies in the automotive and petroleum industries and sponsored by the American Petroleum Institute through the Industrial Research Foundation. They are limited to graduate students who have completed one year of graduate work and have passed their divisional examinations for the Ph.D. degree. The fellow will be required to devote one-half of his time to the work of the Pure Hydrocarbon Research Program and his own research interest should be in the same or a closely allied field. The stipend is $550 for second year graduate students, and the appointment for a period of eleven months. Fellows are eligible for reappointment at $660 a year, subject to satisfactory service. Applications should be filed not later than June 1.

THE JANSKY AND BAILEY FELLOWSHIP

The firm of Jansky and Bailey of Washington, D. C., has established a Fellowship in the Department of Electrical Engineering to encourage fundamental research in Radio Communication. The annual value is $300. The holder of this Fellowship is allowed the same exemption from fees as are the University Fellows and Scholars. Candidates may secure application blanks by addressing the Dean of the Graduate School. Applications should be filed not later than March 1.

POST-DOCTORATE FELLOWSHIPS

E. I. du PONT de NEMOURS AND COMPANY POST-DOCTORATE FELLOWSHIP

The E. I. du Pont de Nemours and Company of Wilmington, Delaware, has established for the year 1940-1941 a post-doctorate fellowship for research in the field of cellulose chemistry. All applicants must hold the degree of Doctor of Philosophy. The stipend is $2000 for the year. Applications must be filed with the Chairman of the Department of Chemistry.

HONORARY FELLOWSHIPS

Persons who have already received their Doctor's degree and are not employed and who wish to carry on research work may be appointed Honorary Fellows. Honorary Fellowships carry no honorarium but persons holding these fellowships are given the complete freedom of the University and are exempt from the payment of all fees, but will be required to pay the cost of any materials consumed in the pursuit of their research. Honorary Fellows are not permitted to take courses for credit.

OTHER FELLOWSHIPS

A number of fellowships are established each year by various organizations and societies for one year only, for the purpose of carrying on research work in definite fields of investigation. Some idea may be gained concerning these fellowships from the following which were among those awarded during the year 1939-1940:

1 E. I. duPont de Nemours and Company Fellowship in Chemistry;
1 Roses, Incorporated Fellowship in Horticulture;
1 Eastman Kodak Company Fellowship in Chemistry;
1 American Chemical Paint Company Fellowship in Horticulture;
1 William S. Merrell Company Fellowship in Bacteriology;
1 Univis Fellowship in Physiological Optics;
1 White-Haines Fellowship in Physiological Optics.

WOMEN GRADUATE RESIDENTS

Three women students will receive stipends of $60.00 a month for nine months of hte year and room and board as Graduate Residents in New Hall. In return they give forty-eight hours a week to duties under the direction of the Head Resident. They pay their own tuition and other fees. They cannot take any additional paid work. More detailed information will be furnished on request.

One Graduate Resident in the W.S.G.A. Cooperative Club has the opportunity to materially reduce her room and board expenses by taking part in this cooperatively-operated residence for upper division students.

Upon application from any sorority, the Board of Trustees will grant free tuition to Graduate Residents for whom the sorority offers a fellowship covering room and obard. In return the Graduate Resident cooperates with the Dean of Women in helping the members of the sorority as an older adviser.

Applications for all of the above three kinds of positions should be made before April 1, 1941.

LIVING ARRANGEMENTS

The President of the University has the authority to supervise living arrangements of students not residents of the city of Columbus and to order the immediate withdrawal of any student from any boarding or lodging house in which the surroundings are undesirable.

ROOMS AND BOARD FOR MEN

Furnished rooms can be obtained at prices varying from $10.00 to $15.00 a month (single) and $16.00 to $30.00 (double). The cost of the table board in the clubs and restaurants near the University is from $4.00 to $7.00 a week. Board can be secured at the Ohio Union, as well as at Pomerene Hall, at reasonable prices.

Board with furnished rooms can be obtained in private families within convenient distance from the University at rates varying around $8.00 a week.

MEN'S DORMITORIES

The splendid new residence hall for men students, Baker Hall, is to be opened in September, 1940. Rates for room and board are from $105.00 to $120.00 a Quarter, according to the type of room selected. Rooms are furnished in a comfortable and convenient manner. Adequate social and recreational privileges are available.

Students interested in residence should write to the Men's Housing Bureau, Ohio State University, for a special bulletin describing the hall and an application form. Assignments will be made in the order of application.

The University possesses three very low-cost dormitories for men, the Tower Club, the Stadium Club, and the Buckeye Club. The Clubs were organized for men who are in great need of financial assistance and no others should apply for admission.

Applicants with unusually good records in the high school are eligible for consideration. Legal residents of Ohio only can be considered.

The Clubs are run on a cooperative dormitory plan with very simple accommodations. Board and room costs are $40.00 a Quarter.

Applications should be sent to the University Examiner.

MEN'S HOUSING BUREAU

Many men students reside in private rooming houses in the University district. In order to assist the students (especially those entering for the first time) in finding desirable rooms at the greatest saving, the University has created the Men's Housing Bureau, located in the office of the Dean of Men, first floor, Administration Building.

A number of cooperative houses have been established in the University district where men students can get room and board for approximately $75.00 a Quarter. In these houses the students are permitted the use of the entire house with all of the conveniences. The men are expected to assist in the work of the house. Applications should be sent to the Men's Housing Bureau.

Classified lists of rooms available for every student and for any number of students are always available at this office. Boarding houses are likewise listed.

If the student signs a "Rooming House Agreement" he shall be expected to be responsible for the rental price of the room as specified in the agreement, unless he can present satisfactory reasons to the Men's Housing Bureau for moving out before the expiration of that period, or, unless he can secure a satisfactory substitute. If he moves out before the expiration of the Quarter without presenting a satisfactory excuse he shall forfeit one month's rent. The signing of such agreement is optional.

The University warns students not to rent rooms that have not been placed on the approved list by the Men's Housing Bureau. Any one renting a room which is not on the approved list does so at his own risk.

WOMEN STUDENTS

The Ohio State University is open to women upon the same conditions and by the same methods of registration offered to men. Every woman student, whether undergraduate or graduate, must register with the Dean of Women at her office in Pomerene Hall during the first four days of each Quarter. The exact dates of registration will be announced each Quarter.

LIVING ARRANGEMENTS FOR WOMEN

All living arrangements for women are under the supervision of the Dean of Women. Applications for residence in the residence halls and private rooming houses should be made directly to the Dean of Women. A limited number of graduate women can be accommodated in these types of residence.

After September 10, 1940, housing cannot be arranged by correspondence, Students or their parents must consult with the Dean of Women in person in Columbus for housing accommodations.

UNIVERSITY RESIDENCE HALLS FOR WOMEN

The University Residence Halls are known as Oxley, Mack, and Neil Halls. A new hall, to be ready for occupancy in 1940-1941, will add two hundred and fifty spaces for women students. All halls are governed by student government with the advice and supervision of the House Superintendent. Booklets describing these residence halls will be sent upon request. Students living in these residence halls shall not change to another residence at any time during the year without the previous consent of the Dean of Women.

PRIVATELY OPERATED RESIDENCE HALLS AND UNIVERSITY HOUSES FOR WOMEN

Westminster Hall, 52 Fifteenth Avenue, under the supervision of the Presbyterian Church and St. Hilda's Hall, 169 West Eleventh Avenue, under the supervision of the Episcopal Church are open as places of residence to women

students. Students living in these residence halls shall not change to another residence at any time during the year without the previous consent of the Dean of Women.

The University Houses, which are really small dormitories privately owned and operated, are also under the supervision of the Dean of Women. The privately operated Residence Halls and University Houses all operate under the student government with the advice and supervision of their superintendents and head residents.

OTHER ARRANGEMENTS

A limited list of rooms in private homes is available for graduate women at the Office of the Dean of Women. There are also a very few light housekeeping rooms and apartments reported to the Dean of Women and available for the inspection of graduate women. Graduate women are not permitted to live in any house where there are men roomers.

ADMISSION

METHOD OF ADMISSION

The admission of students is in charge of the University Entrance Board, which determines the credits that shall be issued on all entrance examinations and certificates, and furnishes all desired information to applicants. Correspondence relating to admission should be addressed to the University Examiner, The Ohio State University, Columbus.

REQUIREMENTS FOR ADMISSION

Admission to the Graduate School is open to all graduates of The Ohio State University as well as to the graduates of all other colleges and universities of approved standing, *provided their undergraduate records are satisfactory.* Before entering upon graduate work in any department, the applicant must present evidence to the effect that he has had the necessary prerequisite training that will enable him to pursue with profit the courses desired. *It must be remembered also that admission to the Graduate School does not imply admission to candidacy for the degree.* No graduate student, not even one who is a graduate of The Ohio State University, is admitted to candidacy for a degree until he has been in residence a sufficient time to enable his instructors to judge of his ability to carry on graduate work.

Information concerning admission to candidacy will be found under the headings "Requirements for the Degrees of Master of Arts and Master of Science" and "Requirements for the Degree of Doctor of Philosophy."

A graduate of a college not on the approved list may be admitted to the Graduate School, provided that his college course, when checked by the University Examiner, entitles him to a credit of not less than one hundred and thirty-five Quarter-credit hours, or ninety semester hours. In all such cases, however, the residence and hour requirements for the graduate degree will be correspondingly increased.

METHOD OF PROCEDURE FOR ADMISSION

An applicant for admission to the Graduate School must first secure a statement from the registrar or other officer of the university or college of which he is a graduate, which contains the following information: (1) the date of graduation of the applicant; (2) the degree received; (3) a complete list of courses taken and grades received. This transcript, together with a catalogue of the institution of which the applicant is a graduate, should be sent to the University Entrance Board not later than three weeks (an earlier date is

preferable) before the opening of the Quarter in which the applicant expects to register. If the credentials are satisfactory, an admission card to the Graduate School will be mailed promptly to the applicant. If the credentials are not satisfactory or if further information is desired, the applicant will be notified at once by correspondence.

In case the applicant finds it impossible to send by mail the statement referred to in the preceding paragraph, he may present it in person when he reports for registration and receive his admission card. However, the office of the Entrance Board is always crowded on the opening days of the Quarters, so that the applicant will find it greatly to his advantage to secure his admission card in advance by correspondence.

METHOD OF PROCEDURE FOR REGISTRATION

The method of procedure for registration is as follows: The student, having secured from the University Entrance Board his admission card to the Graduate School, will present this card at the Office of the Graduate School in Room 106, University Hall. Here he will be given a course of study card and will be instructed as to the further method of procedure for registration. This procedure will include the appointment of an adviser who will assist the student in mapping out, and entering upon the course of study card, a suitable course of study. The adviser will signify his approval of the course of study by signing the card in the appropriate place. The courses having been entered upon the course of study card, the student will then return the card to the office of the Graduate School and will have his schedule card properly filled out and approved. The student will then immediately report to the Registrar's office in the Administration Building and obtain his fee card. He will then pay his fees at the office of the Bursar in the Administration Building. Registration is not complete until the fees have been paid. Even a student who for any reason is exempt from the payment of fees, must report to the Bursar's office and have his fee card stamped. All fees and laboratory deposits required by a student must be paid to the Bursar before the student is entitled to enter his classes.

No student is permitted to change his adviser without the approval of the Dean of the Graduate School.

CHANGES IN COURSE

After a student's election card has been made out, changes in his course of study will be made only upon the written request of the student's adviser, and the statement embodying the reasons for such changes must be left on file with the Dean of the Graduate School. No credit will be given on the University records for courses taken without the proper authorization.

DATE OF REGISTRATION

Registration for any Quarter is permissible at any time during the four-weeks period previous to the opening day of the Quarter. If at all possible a student should register some time during this period. However, students from out of town should write for an appointment before coming to register *during the vacation periods between Quarters* since it is not possible to register without the approval of the department in which the student is specializing. Students who find it impossible to register before the opening day of the Quarter will be allowed to register during the first week of the Quarter *only*.

A student who is exempt from the payment of fees under the regulations of the Board of Trustees must complete his registration promptly in order to obtain such exemption.

AUDITING COURSES

Regularly registered students may audit courses with the written permission of the instructor in charge of the course or courses. Such courses

must be officially entered upon the schedule of the student. Cards for this purpose may be obtained from the office of the Graduate School during the first two weeks of the Quarter only.

WITHDRAWAL FROM COURSES

After registration is completed, the student must report at the office of the Graduate School in order to withdraw officially from any course; otherwise he will be marked "Failed" in the course from which he withdraws. After the middle of the Quarter, the instructor's written permission is necessary before withdrawal from a course will be permitted. Withdrawal from courses will not be permitted after two weeks prior to the beginning of final examinations.

STUDENTS TRANSFERRING TO A COLLEGE IN THE UNIVERSITY

A student who desires to transfer from the Graduate School to a college of this University must make his application for such transfer to the University Examiner. This transfer must be approved by the University Examiner before the student will be permitted to proceed with his registration in the college which he is proposing to enter.

WITHDRAWAL FROM THE UNIVERSITY

A student who desires to withdraw from the University must apply to the Dean of the Graduate School for permission to withdraw in good standing. *If the student leaves the University at any time during the Quarter, without communicating with the Dean, he will be marked as having failed in all of his courses for the Quarter.* If a personal interview is impossible, the Dean must be notified by mail. In order to retain his right to voluntary return, the reasons given for withdrawal must be satisfactory to the Dean, and must be so endorsed at the time the application is filed. After the middle of the Quarter the student must obtain written permission from the instructors in charge of his courses before he may withdraw. No withdrawal from the University will be permitted after two weeks prior to the beginning of final examinations.

The written permission of the Dean shall be filed with the Registrar at once by the Secretary that the proper entry may be made upon the University records.

COMBINATION ARTS AND SCIENCES-GRADUATE COURSE LEADING TO THE TWO DEGREES, BACHELOR OF ARTS AND MASTER OF ARTS

In accordance with an agreement made between the College of Arts and Sciences and the Graduate School, it is possible for students of exceptional ability to secure both the Bachelor of Arts and Master of Arts degrees by an extra Quarter of study in addition to the regular four-year period ordinarily required for the degree of Bachelor of Arts. Indeed, by the proper planning of the sophomore and junior schedule of study, it is even possible to secure both of these degrees in four years.

Admission to the Combination Arts and Sciences-Graduate course is limited to those students in the College of Arts and Sciences who have completed all junior division requirements and at least one hundred and forty-five Quarter hours of work with a point ratio of not less than 3.5.

Students who are eligible and wish to apply for admission to this combination course must do so as soon as they have finished the junior requirements. Such students should report to the office of the College of Arts and Sciences or to the Graduate School for detailed information as to method of procedure.

CREDIT TOWARDS A MASTER'S DEGREE FOR COURSES REQUIRED FOR THE PROFESSIONAL DEGREES IN THE COLLEGE OF DENTISTRY AND IN THE COLLEGE OF MEDICINE

Students admitted by the University Examiner to both the Graduate School and either the College of Dentistry or the College of Medicine may offer not to exceed 15 Quarter hours of work required for either the D.D.S. or M.D. degree towards the Master's degree, or 45 Quarter hours towards the Ph.D. degree, this number to include the 15 Quarter hours already allowed for the Master's degree. No student who has an average of less than "B" in courses taken in the field of specialization is eligible to double registration. To register in this double curriculum the candidate must first secure an admission card from the University Examiner. This admission card must be presented at the office of the Graduate School where a course card will be made out for him. He must then present the same to an adviser who will be appointed in the department in either the College of Dentistry or the College of Medicine in which he wishes to major. The adviser, after consultation with the candidate, will map out the course proposed for the Master's or the Ph.D. degree, which may include the number of Quarter hours of Medical or Dental work referred to above, and sign the card, thus indicating his approval of the course. The candidate will then return the card to the office of the Graduate School. If the course so selected meets with the approval of the Dean of the Graduate School, the candidate will be registered in the Graduate School as well as in the appropriate professional college. In order to secure such double credit the candidate must be registered in the Graduate School during the Quarter in which the work is taken and must receive a grade of "B" or better in the courses required for the Medical or Dental degree.

DEGREES CONFERRED

The following higher degrees are conferred by the University: Master of Arts, Master of Science, Master of Business Administration, Master of Arts in Social Administration, Master of Science in Public Administration, Doctor of Philosophy. The requirements for the Master's degree will be found on pages 30-36 and for the degree of Doctor of Philosophy on pages 36-38. All candidates must read these requirements carefully.

GRADUATE STUDENTS NOT CANDIDATES FOR A DEGREE

Graduate students who are not candidates for a higher degree are designated as "Special Students" and are not required to name a field of specialization, but may elect their work with a view to the special purpose for which they are in attendance at the University. Any course of study announced for advanced undergraduates and graduates is open for election by such students upon the same conditions that are imposed upon those who are candidates for degrees.

Should a graduate student who has not arranged his work with a view to obtaining a degree, subsequently desire to become a candidate for a degree, the amount of credit he is to receive for work already done will be determined at the time he applies for admission to candidacy for the degree.

REGISTRATION DURING THE QUARTER IN WHICH THE DEGREE IS SOUGHT

A candidate for any graduate degree must be registered in the Graduate School during the Quarter in which he expects to come up for the degree.

GRADING SYSTEM FOR GRADUATE STUDENTS

The work of all graduate students performed in connection with the development of theses and dissertations is reported simply as "Prog" indicating

progress until the work is completed when a grade of "Satisfactory" will be reported. All other work is reported as "A" Excellent, "B" Good, "C" Average, "D" Poor, "E" Failed, "E abs." Failed Absent. A graduate student doing acceptable work must attain the mark "A" or "B" in not less than two-thirds of the work included in the course of study outlined for his graduate degree, and not lower than "C" in the remaining one-third.

Any student whose record is deficient under this plan cannot continue as a candidate for an advanced degree except by special action of the Executive Committee of the Graduate Council, on request of the adviser in charge of the candidate's work.

Occasionally, for various reasons, a graduate student may receive a grade of "Incomplete" in a course with the privilege of finishing the work later on. In all such cases, however, this "Incomplete" must be made up not later than the end of the first Quarter *in residence* after the close of the Quarter in which the "Incomplete" was received, or no credit will be allowed for the course.

A student who receives one or more "Incomplete" grades during a Quarter must reduce his schedule for the following Quarter by the number of hours "Incomplete" received.

All graduate students registered in "600" courses are required to complete a certain amount of work in addition to that required of undergraduates. This may consist of reading additional books on the subject and presenting a review of same, the presentation of reports, or of such other work as the instructor in charge of the course may deem wise.

TOTAL CREDIT THAT MAY BE RECEIVED IN ANY ONE QUARTER

A graduate degree stands for concentration in a limited field of study. Although a student may take work in excess of fifteen hours a Quarter, nevertheless he is strongly advised not to do so. *No additional credits will be allowed towards a graduate degree for work taken in excess of fifteen hours in any one Quarter or more than eight hours of graduate credit for work taken during a term of one Summer Quarter.*

CREDIT HOURS FOR PART-TIME ASSISTANTS AND INSTRUCTORS

The maximum credit toward a graduate degree that may be obtained in any one Quarter (a) by a graduate assistant is twelve hours, (b) by an assistant, ten hours, and (c) by an instructor, eight hours. The maximum credit that may be obtained by students holding positions other than those named above will be decided in each case by the Dean of the Graduate School.

SENIORS TAKING COURSES FOR GRADUATE CREDIT

A senior whose full time is not required for the completion of the work for his baccalaureate degree may select certain courses for graduate credit, *but to do this permission must be obtained at the office of the Graduate School (Room 106, University Hall) before registering for the courses.* A grade of "B" or better must be received in order to obtain graduate credit. Not more than fifteen Quarter hours of such work may be counted towards an advanced degree.

GRADUATE WORK IN THE SUMMER QUARTER

Candidates for the Master's degree may complete the residence requirement for such a degree by pursuing graduate work at the University for three full Quarters. For the benefit of those who cannot stay during the entire Summer Quarter, this Quarter is divided into two equal terms; and candidates for the Master's degree may complete their residence requirement by pursuing graduate work for *four* summer terms, provided that in the *ad interim* periods between the Summer Quarters fifteen Quarter hours of satisfactory work are completed under the direction of one or more members of the instructional

staff of the department in which the student is specializing. The amount of such work that will be credited towards any advanced degree is limited to fifteen Quarter-hours, and the amount during any one *ad interim* period to eight Quarter-hours. Hence, under this plan the four terms cannot be taken in two Summer Quarters.

No student is allowed to pursue *ad interim* work unless he has been in residence in the Graduate School of this University at least one term of a Quarter. Moreover, it is optional with any member of the instructional force as to whether or not he will conduct such work.

A student who wishes to pursue *ad interim* work will proceed as follows: Before the close of the Summer term in which he is in residence he will obtain from the office of the Graduate School an appropriate card and, after consultation with the professor in charge of the proposed *ad interim* work, will enter upon this card a brief outline of the work to be pursued in the *ad interim* period. After securing the signature of the professor thus signifying his willingness to conduct the proposed *ad interim* work, the student must deposit this card in the office of the Graduate School before the close of the Summer Quarter. As an evidence of earnest intentions, he must also register in the University (this does not imply attendance) for at least one Quarter of each period during which the *ad interim* work is being pursued. He is also required to report to the professor conducting his work at least once a month and to pass such examinations as may be prescribed. He may borrow from the University Library such books as may be necessary for the successful conduct of the work, but will be required to pay for the cost of shipment. Requests for such books should be sent to the Dean of the Graduate School.

OFF-CAMPUS RESEARCH WORK

A student who for any reason desires to carry on off-campus research work in connection with his thesis or dissertation must have his program approved in advance by the appropriate department and by the Dean of the Graduate School, must maintain his registration in the Graduate School during this entire period, and must pay the regular residence fees. No student may carry off-campus research work unless he has been in residence in the Graduate School of this University for at least one Quarter. Not more than two Quarters of off-campus research may be applied towards a Master's degree and not more than six Quarters towards a Ph.D. degree. Two Quarters of off-campus research are equivalent to one full Quarter of residence work.

THE FRANZ THEODORE STONE LABORATORY

The Franz Theodore Stone Laboratory on Gibraltar Island, Put-in-Bay, Ohio, affords exceptional opportunities to graduate students who wish to carry on research work in botany, entomology, and zoology. The Laboratory will be open during the entire year and students may register for work during any or all of the Quarters. The general rules that apply to graduate work carried on at the University apply equally to the graduate work taken at the Laboratory. The work of instruction is carried on by members of the University Faculty and by members of the faculties of other colleges and universities. Students interested in this work should send to the University Examiner for the Franz Theodore Stone Laboratory Bulletin.

REQUIREMENTS FOR THE DEGREES OF MASTER OF ARTS AND MASTER OF SCIENCE

The degree of Master of Arts will usually be conferred upon candidates whose work lies in the departments properly included in the College of Arts and Sciences, the College of Education, or the College of Commerce and Ad-

ministration, while the degree of Master of Science will usually be conferred upon candidates whose work lies in the College of Agriculture, the College of Engineering, the College of Medicine, or the College of Veterinary Medicine.

Residence Requirement. A residence of three Quarters or its equivalent wholly devoted to graduate work is required. However, a student may reduce this residence requirement to two Quarters (taken in four terms of different summer Quarters) by completing in a satisfactory way fifteen Quarter-credit hours of *ad interim* work as outlined on page 29. A graduate of The Ohio State University may do not to exceed one-half of the required work at another institution having equivalent opportunities for study. The candidate is, however, subject to final examination by The Ohio State University on all work offered for the degree.

A student holding a graduate assistantship must spend at least six weeks in addition to the three Quarters, in order to fulfill the residence requirement. For a part-time assistant, a minimum residence of four Quarters is required, during one of which he must devote full time to his graduate work.

Students entering from other accepted graduate schools will be credited with work already completed, provided authorized statements are presented to the effect that such students have credit in the graduate school for the work specified. *However, no student will be given a degree by The Ohio State University unless he has satisfactorily completed forty-five Quarter-hours of work under the guidance of this University.*

A candidate for the Master's degree must be registered in the Graduate School during the Quarter in which he expects to receive the degree.

Course of Study. The course of study shall be selected in consultation with the student's adviser (see page 26). It must show a reasonable degree of concentration on interrelated subjects and must be pursued under at least two professors. The course of study outlined shall be subject to the approval of the Dean of the Graduate School.

While qualification for the Master's degree is not based entirely upon the completion of a definite number of hours of work, nevertheless, the amount of work required must aggregate not less than the equivalent of fifteen hours of classroom work throughout three Quarters, inclusive of the thesis. This presupposes that the student has completed the necessary prerequisites for graduate work in his chosen field.

Standard of Work Required. A graduate student doing acceptable work for the Master's degree must attain the mark "A" or "B" in not less than two-thirds of the work included in the course of study outlined for his degree, and the mark of "C" or higher in the remaining one-third.

As soon as a student's record falls below the above requirements, he will automatically be made "Special" and will not be reinstated as a candidate for the Master's degree except by permission of the Executive Committee of the Graduate Council. A student who has been made "Special" because of poor grades will not be permitted to register for thesis or dissertation work nor will he be permitted to take the foreign language examinations for the Master's degree or the Doctor of Philosophy degree.

Admission to Candidacy. A student desiring to be admitted to candidacy for a Master's degree must file his application for admission to candidacy for the degree with the Dean of the Graduate School at a date not later than two weeks after the opening of the Quarter in which the degree is sought.

A penalty of $5.00 will be assessed for failure to file an application for admission to candidacy at the time prescribed by the above regulations.

The applications are made upon special blanks secured from the office of the Graduate School. These applications are passed upon by the Executive Committee of the Graduate Council. Admission to candidacy is based upon undergraduate training and ability to pursue graduate work as revealed by

the official reports upon the student's course. No student will be admitted to candidacy until he has completed at least the equivalent of two Quarters' work.

Examination. A student working for a Master's degree is required to pass the regular final examinations in all courses for which he is registered and must receive grades in accordance with the regulations of the Graduate School. A general comprehensive examination also is required to test the candidate's knowledge of the study which he has mainly pursued. This general examination is held after the submission and approval of the thesis; it is conducted by a committee composed of the candidate's adviser (chairman) and at least one other member of the instructional force chosen by him. The general examination may be either written, oral, or both at the option of the examining committee. The chairman of the committee is responsible for arranging the examination and for certifying its results to the Dean of the Graduate School. The report of this committee must be unanimous in order to be considered satisfactory. However, when the examining committee consists of three or more members of the instructional staff, in case of a *single* dissenting vote, the case is automatically referred to the Executive Committee with power to act.

A candidate who fails in his general examination must register in the Graduate School and carry on work for an additional Quarter before an opportunity will be given for a second general examination, unless special permission is granted by the Graduate Council for an earlier examination at the request of the department concerned. No student will be permitted a third examination.

Thesis. A satisfactory thesis is required. The subject of the thesis, together with the written approval of the professor directing the work, must be filed in the office of the Graduate School at a date not later than that on which the student applies for admission to candidacy.

A candidate who expects to receive his degree at the end of a given Quarter must submit the completed manuscript of his thesis ready for typewriting to his adviser not later than three weeks prior to Commencement Day. If the manuscript is approved the candidate must at once prepare two typewritten copies of the same, following specifications which may be obtained at the office of the Graduate School. If the thesis is then approved the candidate shall deposit it in duplicate in the office of the Graduate school *not later than a date which will be set by the Graduate School for each Quarter* and must pay to the Bursar a fee ($2.50) covering the cost of binding the same.

In case the thesis has already been published, the candidate, instead of following the above procedure, may present two printed unbound copies to his adviser, not later than three weeks prior to Commencement Day. The form of printing as well as the contents must be approved by his adviser. If the thesis is so approved the student must deposit these copies in the office of the Graduate School *not later than a date which will be set by the Graduate School for each Quarter* and must pay to the Bursar a fee ($2.50) covering the cost of binding the same.

The thesis requirement may be waived by the Dean of the Graduate School upon the written recommendation of the candidate's adviser. In all cases where the requirement is waived, action must be taken prior to the date for the filing of the thesis subject.

Abstract of Thesis. In addition to the two approved copies of the thesis which must be deposited in the office of the Graduate School, each candidate must deposit in the office of the Graduate School one *approved* typewritten copy of an abstract of the thesis of approximately three hundred words in length. At the close of each Quarter the Graduate Council proceeds immediately to print the abstracts of all the theses submitted during the Quarter, and to bind these together, in sufficient numbers to meet the exchange list of the University Library. Each candidate must deposit with the Bursar of the University not later than *a date which will be set by the Graduate School for each Quarter* the sum of $5.00 *in cash.* This sum will be used by the Graduate Council to

defray expenses connected with the editing, printing, and binding of the abstracts of theses.

Time Limit on Work for Master's Degree. The entire work for the Master's degree must be completed within a period of six years. In the case of students who take *all* the work for the Master's degree during Summer Quarters, the above rule will be interpreted to include the seventh Summer Quarter.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS WITH PHYSICS AND EDUCATION AS FIELDS OF SPECIALIZATION

The following program of study leading to the degree of Master of Arts is arranged for students who have had a good undergraduate training in physics, mathematics, and chemistry, and desire to prepare to teach physics in the secondary schools. Such students must have a high academic standing, good personality and a sincere interest in teaching as a life career.

In addition to obtaining credit for a minimum of thirty Quarter-credit hours in approved graduate courses in physics, mathematics, and chemistry, the following educational requirements must be met: (a) Within the first three Quarters of residence, candidates for this degree must pass a comprehensive examination on the fields covered by Philosophy of Education; Theory and Practices in Secondary School Teaching, Education 533-534; General and Educational Psychology, Psychology 401-407; and History of Education, Education 632; and in addition the departmental examination required of all candidates for the Master of Arts degree in the Department of Education; (b) Credit must also be secured in the following professional courses: Education 701 or 702, Major Course in Secondary Education; Education 684, Teaching of General and Physical Science; Psychology 610, Adolescence, or Psychology 628, Principles and Economy of Learning; and Education 536, Student Teaching in Secondary Schools, which must be taken in the last Quarter of residence. Credit for this course will be withheld until the degree of Master of Arts is granted.

The program of each student, including the thesis, will be supervised by two advisers, one designated by the Chairman of the Department of Physics and Astronomy and the other by the Chairman of the Department of Education. Selection of courses in physics, mathematics, and chemistry will be subject to the approval of these advisers.

GRADUATE CURRICULA IN SOCIAL ADMINISTRATION

The graduate curricula in Social Administration are designed to prepare students for professional positions in various fields of social work including community organization, social case work, group work and recreation, penology, research, community health organization and rural social work. Students whose general maturity, education and experience justify it, may be admitted to courses for which they are qualified, subject to the approval of instructors, without becoming candidates for the degree.

Emphasis in graduate work in the School of Social Administration at The Ohio State University has been placed on preparation for executive positions in individual private agencies, in governmental departments, and in community organizations such as Community Chests and Councils of Social Agencies. Increased attention, now being given by the School to other areas of graduate training for social work, will further enrich and strengthen the preparation provided for such positions.

REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN SOCIAL ADMINISTRATION

The curricula offered by the School for properly qualified students lead to the degree of Master of Arts in Social Administration. To receive this degree students must be registered in the Graduate School at Ohio State

University for six Quarters* of which not less than one or more than two may be devoted to field work. However, with the approval of the Director of the School, students whose academic background, maturity, ability and experience justify it, may secure this degree upon the completion of four or more and less than six Quarters full time work in the Graduate School.

In addition to the courses provided, candidates for this degree must have at least thirty Quarter hours of approved courses in social and biological sciences. This requirement may be met by courses taken either before or after registration, but without credit toward the degree. Candidates for the degree of Master of Arts in Social Administration must also meet the same requirements in regard to a thesis and final examination as are prescribed by the University for the degree of Master of Arts or Master of Science.

GENERAL REQUIRED COURSES

All students who are candidates for the degree of Master of Arts in Social Administration must register for Social Administration 845 and 846, Methods of Social Investigation, and for Social Administration 950, Research in Social Administration, or their equivalents.

The program of study for each student (in addition to the general required courses listed above) will be arranged, with the assistance and approval of his faculty adviser and of the Director of the School of Social Administration, according to the particular field of social work in which the student desires to specialize and with proper consideration of recognized requirements for professional training in that field. Any "600" or "800" courses in Social Administration, Sociology, or other departments of instruction of the University are available, subject always to the approval of the adviser and appropriate instructor.

GRADUATE COURSE IN PUBLIC ADMINISTRATION

It is the object of this course to prepare students for responsible posts in government service, particularly in administrative work. Public personnel administration, budget administration, public reporting, taxation and public finance, legislative drafting, governmental research, governmental accounting, and other fields not included in other professional curricula of the University, all offer opportunities for a career. The student who secures both a broad foundation and a grasp of technique is in demand both by government and by private research agencies. A broad foundation is offered by the undergraduate curriculum in public administration in the College of Commerce and Administration or its equivalent. The detailed requirements of this undergraduate curriculum and of the graduate curriculum which follows are subject to modification to meet the needs of individual students. Students who have not met these requirements of a broad background in the fields of government and economics may find it necessary to spend a somewhat longer time on their graduate work in order to complete the work for the degree.

REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN PUBLIC ADMINISTRATION

To receive this degree, students must be in residence at The Ohio State University for at least three Quarters and an additional Quarter must be devoted to field work with some governmental or research agency approved by the adviser. A report upon such field work must be filed with the adviser and approved by him. Organizations with which field work may be done include: the State of Ohio, the principal cities of the state, the important counties of Ohio, public and private governmental research bureaus, and numerous other organizations of local or state-wide scope. Candidates for the degree of Master of Science in Public Administration must also meet the same requirements in

* Students desiring to transfer credit from other colleges and universities see statement, Graduate Bulletin, page 25.

regard to a thesis and final examination as are prescribed for the degrees of Master of Arts and Master of Science.

CURRICULUM IN PUBLIC ADMINISTRATION

GENERAL REQUIRED COURSES

Autumn Quarter			Winter Quarter			Spring Quarter		
Political Science Research in Political Science	(950)	3-5	Political Science Research in Political Science	(950)	3-5	Political Science Research in Political Science	(950)	3-5
Political Science Research in Public Administration	(808)	3-5	Political Science Research in Municipal Government	(809)	3-5	Political Science Research in Public Opinion	(807)	3-5

PUBLIC PERSONNEL ADMINISTRATION (OPTIONAL)

Psychology Industrial Psychology	(637)	3	Psychology Mental and Educational Tests	(613)	3	Psychology Clinical Tests	(618)	2
Business Organization Industrial Organization and Management	(680)	5	Psychology Psychology and Personnel	(639)	3	Business Organization Personnel Organization and Management	(686)	3
Psychology Individual Testing	(616)	2	Psychology Criminal and Legal Psychology	(634)	5	Business Organization Office Organization and Management	(691)	3
			Industrial Engineering Management of Men in Engineering Industries	(601)	4			

BUDGETING AND PUBLIC FINANCE (OPTIONAL)

Economics Public Finance	(631)	3	Economics Public Finance	(632)	3	Economics Public Finance	(633)	3
Economics Statistical Analysis	(807)	2	Economics Statistical Analysis	(808)	2	Economics Social Insurance	(639)	3
Accounting Cost Accounting	(603)	5	Accounting Cost Accounting	(604)	5	Economics Statistical Analysis	(809)	2
						Accounting Government Accounting and Budgeting	(630)	3

MUNICIPAL ADMINISTRATION (OPTIONAL)

Economics Public Control of Industry	(865)	2	Economics Public Control of Industry	(866)	2	Economics Public Control of Industry	(867)	2
Social Administration Penology	(626)	3	Social Administration Social Statistics	(639)	5	Social Administration Community Organization	(668)	3
Civil Engineering Sanitary Engineering	(602)	5	Social Administration Public Recreation	(855)	3	Law Municipal Corporations		3

DEGREE OF MASTER OF BUSINESS ADMINISTRATION

GENERAL REQUIREMENTS

To receive the degree of Master of Business Administration students must comply with all the regular requirements laid down for the degrees, Master of Arts and Master of Science (see pages 30-33). In addition to these requirements each candidate must meet the following general requirements.

Prerequisites. Before a student may become a candidate for the degree of Master of Business Administration or early in his Master's work he must have credit for the following subjects: Principles of Economics, Principles of Accounting, Principles of Geography, the equivalent of six Quarter-hours in Business Law, introductory courses in Corporation Finance, Industrial Management, Marketing, Economic Statistics, Money and Banking. (The specific courses noted may be taken during either the undergraduate or the graduate years.)

A thesis will be required of all candidates for this degree and the credit granted for the thesis shall not exceed six Quarter hours.

The credit granted for work in the field of specialization shall not be less than twelve nor more than twenty Quarter hours.

The candidate shall take work in at least three fields other than his field of specialization.

In addition to these general prerequisites, the department in which the candidate elects to specialize will have the following prerequisites:

The Department of Accounting: credit for additional courses in Business Law, three Quarter-hours; Public Finance, six Quarter-hours; Accounting, thirty-five Quarter-hours.

The Department of Business Organization: approved courses in either Transportation, Insurance, or Public Utilities for a student wishing to specialize in any one of the fields in Business Organization.

The Department of Geography: at least eighteen Quarter hours in courses in Geography, including economic geography, the United States, and another regional course.

REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Scholastic Requirements. The general requirements for the degree of Doctor of Philosophy are: (1) A reasonable mastery of the field of specialization chosen, tested by a general comprehensive examination given approximately one year previous to the date on which the candidate expects to come up for the degree; (2) compliance with the language requirements as set forth in the paragraph entitled "Language Requirement," see below; (3) the presentation of an acceptable dissertation embodying the results of an original investigation; and (4) the passing of a final oral examination upon the dissertation and the immediate field in which the investigation lies.

Residence Requirement. While it is not intended that the degree shall be given as a certificate of faithful and industrious work for a specified length of time, yet it is not believed that the scholastic requirements as given above can be secured by less than the equivalent of three years work devoted wholly to graduate study and investigation with suitable facilities and under proper supervision. Of these years, at least one, and that except by permission of the Graduate Council, the last, must be spent in residence at this University. In case any part of the work is done elsewhere than in this University, such work shall be subject to the approval of the Graduate Council.

A candidate for the degree of Doctor of Philosophy must be registered in the Graduate School during the Quarter in which he expects to receive the degree.

Course of Study. The course of study to be pursued for the Doctor's degree will be arranged with each student by his adviser, but the choice of work must be approved as a whole by the Dean of the Graduate School. Work in other departments will be advised according to the needs of the individual student. In all cases the aim will be a reasonable concentration and a reasonable breadth of study, designed to foster both a knowledge of the specialty in relation to allied branches of learning and the power of productive scholarship.

Language Requirement. The foreign language requirements for the Ph.D. degree may be met by one of the two following methods: (1) A dictionary reading knowledge of two modern foreign languages; (2) a thorough reading knowledge of one modern foreign language.

The chairman of the department in which the candidate is specializing must notify the office of the Graduate School, in writing, of the method which the candidate will use in fulfilling the language requirements.

The modern foreign languages submitted under methods 1 and 2 must be languages in which there is a substantial body of scholarly literature bearing upon the student's field of specialization.

Before a student will be permitted to take his general examination, he must meet the language requirements. The language examinations are conducted by

the language departments concerned and are given once each Quarter on a date announced at the opening of the Quarter. Blanks for taking these examinations must be obtained at the office of the Graduate School not later than ten days before these announced dates. The subject matter of the examination shall be drawn from the literature of the student's field of specialization.

No student will be permitted a re-examination in modern foreign languages during the same Quarter in which he failed the examination. Permission for re-examination in subsequent Quarters can be granted only by the examiner, upon evidence of work done since the former examination, sufficient to justify a re-examination.

General Examination and Admission to Candidacy. Not later than the middle of the second Quarter prior to the Quarter in which he expects to come up for his degree, a student working for the degree of Doctor of Philosophy is required to pass a general comprehensive examination on the fundamentals of the entire field in which he has elected to specialize without limitation to the courses which the student has pursued. For example, a student who expects to come up for the degree at the end of the Spring Quarter must pass this general examination not later than the middle of the Autumn Quarter. He must be registered during the Quarter in which he expects to take the general examination unless excused by the Dean of the Graduate School. This examination must be a written one to be followed by an oral examination. The satisfactory passing of this examination carries with it admission to candidacy for the degree.

After admission to candidacy the candidate must be registered in the Graduate School for at least two more Quarters provided this will complete his residence requirement. Whenever a student is permitted to take the general examination without being registered, he must register for at least *three* more Quarters before coming up for the degree. He will be given complete freedom from all course requirements and will be registered for dissertation only. However, he will be permitted to audit any courses he may choose. No student will be permitted to take the general examination until after he has met the language requirements.

The general examination is conducted by a committee appointed by the Dean of the Graduate School, upon written request of the student's adviser. This committee shall consist of the student's adviser (who acts as chairman), and such other examiners as the Dean may designate, including at least one who is not a member of the department directly concerned. When the adviser decides that the student is ready for the general examination, he will so notify the office of the Graduate School, in writing, at the same time suggesting the personnel of the examining committee, for the approval of the Dean. After the committee has been approved by the Dean, appropriate blanks for reporting the results of the examination will be sent to the adviser. The selection of a time and place for the examination will be entirely in the hands of the adviser, but he is expected to consult with the various members of the committee before fixing a time for the examination. Immediately after the close of the examination the committee shall certify to the Graduate School, on the blank furnished the committee, whether or not the student has passed the examination. In order to be considered satisfactory, the report of the examining committee must be unanimous. However, when there is but a *single* dissenting vote the case is automatically referred to the Executive Committee with power to act.

If a candidate fails the general examination he cannot be re-examined until the examining committee recommends such a re-examination and the Graduate Council approves the recommendation. No candidate will be permitted to take the general examination more than twice.

Dissertation. A dissertation which is a definite contribution to knowledge of importance sufficient to warrant its publication shall be offered by the can-

didate. *A copy of the completed dissertation bearing the written approval of the candidate's adviser must be presented at the office of the Graduate School not less than four weeks previous to the end of the Quarter in which the degree is sought.*

The Dean, after consultation with the candidate's adviser shall then appoint a Committee to consider the merit of the dissertation. The dissertation, together with the report of this Committee, shall be laid before the Council, who will then vote upon the question of its acceptance. In order to be considered satisfactory the report of the committee must be unanimous.

Each candidate must deposit in the office of the Graduate School, not later than a date which will be set by the Graduate School for each Quarter, two *approved* printed or typewritten copies of the complete dissertation, complying in form with specifications obtainable in the Graduate School office. The candidate must also deposit the sum of $2.50 with the Bursar of the University to cover the cost of binding these copies.

The Final Examination. The final examination is held after the approval of the dissertation. It shall be conducted by a committee consisting of the candidate's adviser (who shall act as chairman) and such other examiners as the Dean of the Graduate School shall designate, after consultation with the candidate's adviser, and shall include at least one person who is not a member of the department directly concerned. The time and place of the examination shall be set by the Chairman of the Examining Committee after consultation with the other members of the committee and the office of the Graduate School shall be promptly notified. The examination shall be oral and shall deal intensively with the portion of the candidate's field of specialization in which his dissertation falls, though it need not be confined exclusively to the subject matter of the dissertation. A written examination also may be required at the discretion of the department concerned. In order to be considered satisfactory the report of the examining committee must be unanimous. However, when there is but a *single* dissenting vote, the case is automatically referred to the Executive Committee of the Graduate Council with power to act.

Abstract of Dissertation. Each candidate must also deposit in the office of the Graduate School, not later than a date which will be set by the Graduate School for each Quarter, one *approved* typewritten copy of an abstract of the dissertation, approximately three thousand words in length. He must also deposit with the Bursar of the University, not later than a date which will be set by the Graduate School for each Quarter, the sum of $50.00 *in cash*. This sum will be used by the Graduate Council to defray the expenses connected with the editing, printing, and binding of the abstracts of dissertations.

COMMENCEMENT—CONVOCATION

A special Convocation or Commencement is held at the close of each Quarter for the conferring of degrees upon candidates who have fulfilled all the requirements of their respective courses.

ATTENDANCE AT CONVOCATION EXERCISES

All candidates for degrees are required to be present at their graduation convocation unless excused by the President.

RESEARCH INSTITUTES

The following institutes have been organized for furthering research in various fields in order to afford the facilities for carrying on research work whose confines are not limited to a single department:

(a) **The Plant Institute.** This institute affords the facilities of the Departments of Botany, Horticulture, Agricultural Chemistry and Agronomy.

(b) **The Animal Institute.** This institute is organized for the purpose of investigating problems lying in two or more of the following departments: Agricultural Chemistry, Anatomy, Animal Husbandry, Bacteriology, Physiology, Poultry Husbandry, Veterinary Medicine, and Zoology and Entomology.

(c) **The Social Science Institute.** This institute deals with problems which lie in two or more of the following departments: Business Organization, Business Research, Economics, Education, Educational Research, Geography, History, Law, Philosophy, Political Science, Psychology, Rural Economics, Social Administration, and Sociology.

UNIVERSITY ORGANIZATIONS

There are a number of organizations in the University of especial interest to the graduate students. The Gamma Alpha Fraternity, a graduate scientific society, has its own house at which a number of the members of the society live and a still larger number board. There is also the Graduate Club in social educational sciences and the Graduate Women's Club.

The main object of all of these clubs is to bring members together for social purposes and for the discussion of the various problems in which the individual members are interested.

There are also chapters of the national honorary societies, Phi Beta Kappa and Sigma Xi, as well as a number of honorary fraternities. In addition to these, nearly every department offering graduate work has its own graduate club.

UNIVERSITY LECTURES

Each year a number of lectures of special interest to graduate students are given by distinguished scholars from various educational institutions. Some of these lectures are of interest primarily to those in certain fields of work while others are of a general character and of interest to graduate students in general, no matter what their fields of activity may be.

DEPARTMENTS OF INSTRUCTION

The general prerequisites for courses open to graduate students with credit toward a degree are given below. In some departments more detailed prerequisites are required, and in all such cases a statement of these will be found in the description of the courses listed in the departments.

General prerequisites for courses numbered from 600 to 799:

At least junior standing and prerequisites that amount to 20 Quarter hours in the same and allied subjects of which a minimum of at least 10 Quarter hours must be in the same subject; or 30 Quarter hours in not more than two allied subjects.

Special prerequisites as stated in the description of courses must be included within these requirements.

Certain 600 courses in the field of education require as a prerequisite graduate standing in the field of education. These courses are appropriately designated in the list given under the general heading of "EDUCATION."

General prerequisites for courses numbered 800 or above:

These courses are open only to students registered in the Graduate School and have prerequisites that amount to 30 Quarter hours in the same and allied subjects, of which a minimum of 15 Quarter hours must be in the same subject.

COURSES OF GENERAL INTEREST

The courses listed below are of such a character as to be of general interest to all graduate students irrespective of their fields of specialization.

Survey Course 605. Foundations of Contemporary Civilization.

Survey Course 608. Development of Modern Science.

Survey Course 664. Student Economic Problems and the Adviser.

Survey Course 665. Principles of Psychology for Advisers.

(For a full description of these courses see page 216 of this Bulletin, under the heading "Survey Courses.")

Philosophy 652. Philosophy of Science.

(For a detailed description of this course see page 166 of this bulletin.)

ACCOUNTING

Office, 309 Commerce Building

PROFESSORS TAYLOR, ECKELBERRY, AND MILLER, ASSOCIATE PROFESSORS HECKERT, DICKERSON, AND WILLCOX, ASSISTANT PROFESSOR SHONTING, MR. BOLON, MR. WALL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," see page 40.

602. Advanced Principles of Accounting. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Taylor, Mr. Eckelberry, Mr. Miller.

The accounting procedure in connection with corporate reorganizations and dissolutions. Consolidated balance sheets and income statements, branch house accounting, foreign exchange accounting.

603-604. Cost Accounting. Five credit hours. Two Quarters. 603, Autumn and Winter; 604, Winter and Spring. 603, four class meetings and one two-hour laboratory period each week. 604, five class meetings each week. Not open to students who are taking Accounting 624. Mr. Heckert, Mr. Willcox.

The application of material, labor, and burden costs to the product under the order and process plans. The use of standards and other methods of control in production and distribution accounting.

607-608. Auditing. Two credit hours. Two Quarters. 607, Autumn Quarter; 608, Winter Quarter. General prerequisites must include Accounting 602 and 604. Mr. Wall, Mr. Taylor, Mr. Eckelberry, Mr. Miller.

The various kinds of audits and their respective uses. Methods followed in verifying balance sheets and profit and loss accounts. Audit reports and certificates. Duties and responsibilities of an auditor.

610. Cost Reports for Executives. Three credit hours. Winter Quarter. General prerequisites must include Accounting 604 or 624. Mr. Willcox.

A study of the principles underlying the preparation and use of operating reports. Some consideration will be given to the form and content of reports for both major and minor executives.

611. Introduction to Income Tax Accounting. Two credit hours. One Quarter. Autumn and Spring. Two class meetings each week. Mr. Miller, Mr. Wall, Mr. Dickerson.

The accounting principles and procedure involved in the Federal taxes on income and profits. Practice in preparing simple income tax returns from the accounts of individuals and corporations.

612. Constructive Accounting. Four credit hours. Spring Quarter. Four class meetings each week. General prerequisites must include Accounting 603-604. Mr. Heckert, Mr. Willcox.

Practice in designing accounting systems for typical business enterprises.

613-614. Accounting Practice. Four credit hours. Two Quarters. 613, Autumn Quarter; 614, Winter Quarter. Four class meetings each week. General prerequisites must include Accounting 602, 604, 611, and 616. Mr. Taylor, Mr. Miller.

Practice in the solution of typical accounting problems. The class material is taken largely from the Certified Public Accountants' examinations of the various states.

616. Business Statements. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. Mr. Bolon, Mr. Eckelberry.

A study of the different kinds of statements prepared by corporations for the guidance of executives, directors, stockholders, and creditors. The methods used in preparing the necessary statements together with the principles of statement interpretation. Use is made of current statements of well-known corporations. Lectures and problems.

617. Managerial Accounting. Five credit hours. Spring Quarter. General prerequisites must include Accounting 602 and 604. Mr. Heckert.

The organization and function of the controller's department. The use of accounting and statistical data in the protection, control, planning, and coordination of business. Standards and budgetary procedure.

621. Tax Accounting. Two credit hours. Winter Quarter. General prerequisites must include Accounting 611. Mr. Miller.

A general survey of accounting aspects of various taxes. Practice in preparing returns for income, capital stock, payroll, estate, inheritance, gift and property taxes. Attention will be given to the inter-relationships of various taxes.

622. Advanced Accounting Theory. Three credit hours. Spring Quarter. General prerequisites must include Accounting 602. Mr. Taylor.

An examination of some of the prevailing theories of accounting. Recent theories in connection with the valuation of assets; the determination of income and surplus. Each student is required to make a report covering the investigation of some particular subject.

624. Factory Costs. Five credit hours. One Quarter. Winter and Spring. Five class meetings each week. Not open to students taking Accounting 603-604. Mr. Willcox, Mr. Dickerson.

The course is intended primarily for students whose major interest is in fields other than accounting. Emphasis is placed upon the accumulation of material, labor, and expense, cost of production and distribution and to the relationship between cost accounting work and that of other business departments.

630. Governmental Accounting and Budgeting. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include a course in intermediate accounting. Mr. Shonting.

The principles of accounting and budgeting for national, state, and local governments. A study of the fiscal structure of various forms of government. Budgeting and bugetary control. The application of accounting principles to government, with special reference to funds, appropriations, and allotments. The application of costs to governmental activities. The preparation of governmental financial statements and reports.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

804. Seminar in Accounting. Two credit hours. Autumn Quarter.

805-806. Seminar in Accounting. Two credit hours. Winter and Spring Quarters.

807. Distribution Costs. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include a course in intermediate accounting, Business Organization 700, and Accounting 603-604 or permission of the instructor. Mr. Heckert.

Methods of planning and directing sales and distribution effort. Procedure and technique for analysis and control of distribution costs. Accounting procedure for retail, wholesale, and industrial marketing costs.

950. Research in Accounting. Autumn, Winter, and Spring Quarters.

ADULT EDUCATION

(See Bureau of Special and Adult Education)

AGRICULTURAL CHEMISTRY

Office, 211 Townshend Hall

PROFESSOR LYMAN, ASSOCIATE PROFESSORS ALMY AND BURRELL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. General Biological Chemistry. Five credit hours. One Quarter. Autumn and Winter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include a course in general agricultural

chemistry, or its equivalent in organic chemistry and quantitative analysis, together with five hours of biological science. Mr. Burrell.

A study of the chemistry of the fats, carbohydrates, proteins, and other compounds of biological importance, and the general chemistry of the metabolism of plants and animals. This course is intended for students majoring in biological subjects, and as a prerequisite to certain advanced courses in this department.

602. Analysis of Food and Dairy Products. Five credit hours. Spring Quarter. One lecture and twelve hours of laboratory practice each week. General prerequisites must include courses in general agricultural chemistry or the equivalent in organic chemistry and quantitative analysis. Mr. Almy.

Lectures and laboratory work on the composition of cereal foods, feeds, milk, butter, syrups and honey, cocoa and chocolate, extracts and alcoholic beverages.

604. Dairy Chemistry. Five credit hours. Autumn Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include a course in qualitative analysis. It is recommended that Agricultural Chemistry 604, 605, and 606 be taken in sequence. Mr. Almy.

The constituents of milk are studied. Laboratory work includes separation of the major milk constituents in pure form and a study of their chemical properties.

605. Dairy Chemistry. Five credit hours. Winter Quarter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include a course in qualitative analysis. It is recommended that this course be preceded by Agricultural Chemistry 604. Mr. Almy.

An introduction to certain physicochemical concepts such as solution properties, chemical equilibria, mass action, hydrogen-ion concentration, colloidal systems and their properties, etc., which are found useful in the proper understanding of the behavior of milk and dairy products under varying conditions.

606. Advanced Dairy Chemistry. Five credit hours. Spring Quarter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include Agricultural Chemistry 605. Mr. Almy.

A continuation of Agricultural Chemistry 605. The application of physicochemical principles in specific operations in processing milk and in manufacturing dairy products is studied. Topics discussed include creaming, cream whipping, churning, homogenization, effects of heat on milk colloidal systems, etc.

607. Chemistry of Nutrition. Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include Agricultural Chemistry 601 and acceptable courses in physiology, or equivalent. Mr. Lyman.

Lectures on the chemistry of nutrition. Laboratory work includes experiments on digestion and utilization of food, determination of fuel value of food and the heat production of man under various conditions, the analysis of blood for waste products of metabolism, the effects on small animals of diets consisting of purified food constituents, and the effects of selected diets on the formation of waste products in the body.

610. Chemistry of Insecticides. Five credit hours. Winter Quarter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include a course in general agricultural chemistry or equivalent and fifteen hours of biological science. Undergraduates will be permitted to register for this course only on permission of the instructor. Mr. Campbell.

Subject matter is confined to the inorganic insecticides and deals with the preparations, reactions, stabilities, chemical and physical nature and analytical procedures.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. General prerequisites must include Agricultural Chemistry 601. The consent of the instructor is required. All instructors.

Students electing this course must have had at least two five-hour courses in the department. Consent of the department must be secured.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

801. Plant Chemistry. Five credit hours. Spring Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include Agricultural Chemistry 601 and Botany 605. Mr. Burrell.

Lectures, laboratory, and collateral reading on special phases of the chemistry of plant metabolism.

804. Seminar. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in agricultural chemistry. General prerequisites must include Agricultural Chemistry 601. Mr. Lyman.

950. Research in Agricultural Chemistry. Autumn, Winter, and Spring Quarters. Laboratory, library, and conference work. General prerequisites must include Agricultural Chemistry 701. The consent of the instructor is required. Mr. Lyman, Mr. Burrell, Mr. Almy.

Research may be done in nutrition, plant chemistry, food analysis, or dairy chemistry.

AGRICULTURAL EDUCATION

Office, 323 Campbell Hall

PROFESSORS STEWART AND FIFE, ASSOCIATE PROFESSORS KENESTRICK AND HUTCHISON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Special Methods of Teaching Vocational Agriculture in Secondary Schools. Five credit hours. One Quarter. Autumn, Winter, Spring. Three two-hour recitations each week. Mr. Kenestrick.

An intensive application of the information and practices given in the preceding departmental courses to the preparation of material for specific agricultural courses. The organization of subject matter for effective presentation in the classroom, the planning of lessons, laboratory work, and field trips, the methods of teaching through project supervision, and the organization of part-time courses.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter. Autumn, Winter, Spring.

This course is intended for graduates who wish to work out problems in Agricultural Education including Agricultural Extension and Vocational Education in Agriculture.

705. Supervised Practice Program Building. Three credit hours. Winter Quarter. Three discussion periods each week. In addition to the general prerequisites, teaching experience in vocational agriculture or permission of the instructor is required. Students expecting to enroll in this course should communicate with the instructor at least two weeks prior to the beginning of the Quarter in order to arrange for the collection of data on specific problems.

A study based upon researches in project accounting and analysis promoted in Ohio in recent years. Conditions in the field are studied from the assembled material and the findings derived from it. A program of improvement is determined.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Special problems are designed particularly for the training of supervisors of agricultural education and trainers of teachers of vocational agriculture.

†803. The Problem Method Applied to Secondary and College Teaching in Agriculture. Five credit hours. Permission of the instructor must be obtained.

An inquiry into the conditions that promote effective teaching with a determination of procedures that contribute to this end. The possibilities of the problem method in agricultural education are fully explored.

† Not given during the academic year, 1940-1941.

804. State Administration and Supervision of Vocational Agriculture. Three credit hours. Spring Quarter. Three discussion periods each week. Mr. Fife.

A course devoted to a consideration of the following: federal and state legislation relating to vocational agriculture; state plans; records and reports; standards and objectives; teacher training in service; supervisory procedures; state courses of study; placement and recommendations of teachers; promotion of state program; day, evening, and part-time school organizations; and other problems relating to the state administration and supervision of vocational agriculture.

806. Organization and Administration of Teacher Training for Vocational Agriculture. Three credit hours. Winter Quarter. Five lectures each week. Mr. Stewart.

A course devoted to a consideration of the following: state plans for resident teacher training; working relations between teacher training departments and state supervisory organization; teacher training courses offered; analysis of the content of teacher training courses; provisions for observation and practice teaching; research in agricultural education; teacher placement and follow-up program.

***807. Tests and Measurements Adapted to Instruction in Vocational Agriculture.** Three credit hours.

The course is concerned with the development of specific instructional objectives, the analysis of these objectives into expected outcomes, and the formulation of measuring devices to evaluate the outcomes.

†**808. Organization and Methods of Conducting Part-Time and Evening Schools in Vocational Agriculture.** Three credit hours. Autumn Quarter. Three discussion periods each week. In addition to the general prerequisites, teaching experience in vocational agriculture or permission of the instructor is required. Students expecting to enroll in this course should communicate with the instructor at least two weeks prior to the beginning of the Quarter in order to arrange for the collection of data on specific problems. Mr. Hutchison.

A course devoted to an analysis of the problems related to part-time and evening schools in vocational agriculture and to the development of objectives and procedures in the organization and conduct of such instruction.

809. Research for Teachers of Vocational Agriculture. Three credit hours. Spring Quarter. Mr. Stewart, Mr. Fife.

A course devoted to a study of research techniques and procedures appropriate to studies and researches in the field of agricultural education. The course will direct students to a study of procedures in the promotion of research with individual projects in planning, organizing, and projecting appropriate studies.

810. Seminar in Agricultural Education. Three to five credit hours. Autumn, Winter, and Spring Quarters. All instructors.

A study of current problems in agricultural education. Provision for investigation, reports and discussion.

AGRICULTURAL ENGINEERING
Office, 105 Ives Hall

PROFESSORS McCUEN, REED, MILLER, AND OVERHOLT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The general prerequisites include fundamental courses in agricultural engineering, agronomy, mathematics, and physics.

602. Advanced Farm Structures. Five credit hours. Winter Quarter. Three recitations and two three-hour laboratory periods each week. In addition to the general prerequisites, courses in animal husbandry. Mr. Miller.

Advanced study of farm building programs, coordinating engineering, biological, economic and social factors. The general design and details of construction for units and entire farmsteads.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

603. Advanced Farm Power Equipment. Five credit hours. Autumn Quarter. Three recitations and two three-hour laboratory periods each week. Mr. McCuen.

Trends in design and application of modern farm power equipment. The farm tractor and its complement of power equipment, such as combines, threshers, feed mills, corn harvesters, will be used as a basis in a study leading toward power programs for economical production.

604. Advanced Drainage and Irrigation. Five credit hours. Spring Quarter. Three recitations and four hours laboratory each week. In addition to the general prerequisites, a course in land surveying. Mr. Overholt.

Advanced study of conservation of soil by agricultural engineering structures to control erosion, and of soil water regulation through drainage and irrigation systems. A coordination of the biological, engineering, and economic factors involved in individual systems; also, cooperation problems in state and community programs for economic land utilization.

605. Advanced Field Machinery. Five credit hours. Spring Quarter. Three recitations and two three-hour laboratory periods each week. Mr. Reed.

An advanced study of soil working and crop processing units, coordinating biological, engineering, and economic factors. Trend problems starting with present agronomic, engineering, and management concepts regarding use, design, and needs, and progressing toward the solution of major machinery problems in advanced agricultural practices and systems.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. All instructors.

Students selecting this course must have had at least two five-hour courses in the department, one of which must have been in line with the problem chosen. Consent of the department must be secured.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Agricultural Engineering. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. Permission of the department required. Mr. McCuen, Mr. Reed, Mr. Miller, Mr. Overholt.

AGRICULTURAL EXTENSION

Office, 124 Townshend Hall

PROFESSORS RAMSOWER, DIRECTOR, SPOHN, SUPERVISOR OF PROJECTS AND PROGRAMS, AND PRICE, STATE LEADER OF HOME DEMONSTRATION WORK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

600. Extension Education. Five credit hours. Spring Quarter. Five recitations each week. Given in alternate years. Mr. Spohn.

The application of psychology and principles of education to the program and methods used in extension work.

701. Special Problems. Three to fifteen credit hours, taken in units of three or five hours each Quarter. Autumn, Winter, Spring.

This course is intended for graduates who wish to work out problems in Agricultural Education including Agricultural Extension and Vocational Education in Agriculture.

FOR GRADUATES

800 and 900 Courses. A statement of the gneral prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

800. Extension Education. Three credit hours. Autumn, Winter, and Spring Quarters. Mr. Ramsower, Miss Price.

The course will deal with the program of Extension Education pertaining to organization of content and methods in the field of Extension.

The course will be organized for workers in the fields of Agricultural Extension and Home Economics Extension.

AGRONOMY

Offices, 203 Townshend Hall and 102 Horticulture Building

PROFESSORS LEWIS, PARK, WILLARD, CONREY, AND BAVER, ASSISTANT PROFESSORS McCLURE, BATCHELOR, AND SALTER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The general prerequisites should include also fundamental courses in agronomy, agricultural chemistry, and biological science.

601. Soil Fertility. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Baver.

A study of soil fertility practices in the production of both general and specialized crops. Consideration is given to recent developments in fertilizer manufacture, and in the usage of fertilizers, liming materials, green manures, etc. Both theoretical and practical aspects are emphasized.

602. Chemical Methods Used in Soils Investigations. Five credit hours. Autumn Quarter. Two lectures and nine laboratory hours each week. Given in alternate years. Mr. McClure.

The fundamentals of inorganic quantitative analysis as applied to soils, fertilizers, and liming materials.

603. Origin and Classification of Soils. Five credit hours. Spring Quarter. Four lectures and one three-hour laboratory period each week. Mr. Conrey.

The characteristics of soils as developed under various climatic conditions and their application in soil classification with special reference to Ohio conditions. Laboratory study of soil characteristics, field trips to several of the important soil areas in Ohio.

604. Soil Erosion and Its Control. Five credit hours. Winter Quarter. Four lectures and one three-hour laboratory period each week. Mr. Conrey.

A study of the nature, causes, occurrences and economic importance of soil erosion, and of the methods and agencies for its control. Field trips for study of erosion in different regions of the state with visits to erosion experiment station and demonstration control areas.

*605. **Soil Microbiology.** Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. Given in alternate years. Mr. Batchelor.

A study of the more important groups of soil microorganisms and of such biological soil processes as nitrogen accumulation and transformation, oxidation, reduction and carbonization. Applications of the principles of soil microbiology to practical soil management are emphasized.

607. Field Crop Breeding. Five credit hours. Winter Quarter. Four two-hour lecture-laboratory periods each week. Given in alternate years. In addition to the general prerequisites, a course in botany and a course in heredity. Mr. Lewis.

Application of genetics to the improvement of field crops. Study of the theory and special techniques of breeding each type of crop plant. Detailed study of corn breeding, of hybrid seed corn production and of the production of registered and certified seed of other crops.

608. Soil Physics. Five credit hours. Winter Quarter. Three lectures and two three-hour laboratory periods each week. In addition to the general prerequisites, a course in physics. Mr. Baver, Mr. McClure.

A study of the physical properties of soils, including the physical makeup of soils and methods of determination, the physical nature of the colloidal fraction, soil structure, soil consistency and plasticity, soil-water and air relationships, and soil temperature and warmth.

Special emphasis is placed on the applied aspects of soil physics in relation to tillage, soil and water conservation, drainage and irrigation.

609. Physical Chemistry of Soils. Five credit hours. Spring Quarter. Three lectures and two three-hour laboratory periods each week. General prerequisites must include Agronomy 602 or 608. Mr. Baver, Mr. McClure.

A study of the origin, nature, and physicochemical behavior of colloidal clay and organic matter in relation to soil acidity, base exchange, reaction of soil with fertilizers, the composition of the soil solution, the availability of plant nutrients and the growth of plants.

* Not given in 1940-1941.

701. Special Problems. Three to fifteen credit hours. May be taken in units of three or five credit hours for one or more Quarters. Autumn, Winter, Spring. The consent of the instructor is required. All instructors.

Problems involving library, laboratory or field study in plant breeding, weed control, field experimentation, special crops or special soils problems may be selected.

702. Agronomy Seminar. Two to four credit hours. Autumn, Winter, and Spring Quarters. The consent of the instructor is required.

Topics for 1940-1941:

Autumn Quarter: Experimental Methods in Agronomy. Mr. Wilard.
Winter Quarter: Soils in Relation to Land Use. Mr. Conrey.
Spring Quarter: Application of Colloid Chemistry to Soils and Plants. Mr. Baver.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Agronomy. Autumn, Winter, and Spring Quarters.

Research work in plant breeding and crop production under the direction of Mr. Park, Mr. Willard, and Mr. Lewis; research work along physical, chemical, or biological lines as related to soils under the direction of Mr. Baver, Mr. Conrey, Mr. Batchelor, and Mr. McClure.

AMERICAN HISTORY
(See History)

ANATOMY
Office, 410 Hamilton Hall

PROFESSORS BAKER AND KNOUFF, ASSOCIATE PROFESSORS EDWARDS AND SETTERFIELD, ASSISTANT PROFESSORS PALMER, YATES, AND GRAVES, MR. GUTHRIE, MR. OSBORN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Courses 621-700 inclusive are open only to students doubly registered in the College of Medicine and the Graduate School; courses 628, 638, 639, and 640 are open only to students doubly registered in the College of Dentistry and the Graduate School to the extent of 15 Quarter hours.

601-602-603. Seminar. One credit hour. Autumn, Winter, and Spring Quarters. One conference each week. General prerequisites must include two Quarters of anatomy. Required of all graduate students and recommended for anatomy majors. The staff.

Lectures by members of the staff, conferences on investigations being carried on in the department, and reports on recent investigations in anatomy. Subjects for extended study will be changed from Quarter to Quarter.

604. Anatomical Methods. Three or five credit hours. One Quarter. Autumn, Winter, Spring. One conference and the equivalent of four or eight laboratory or study hours each week. The staff.

This course is designed for and limited to anatomy majors desiring to begin investigative work.

A study of the various techniques employed in anatomical research. Permission of the director must be secured.

611. Comparative Histology. Five credit hours. Autumn Quarter. Two lectures and nine laboratory hours each week. General prerequisites must include Anatomy 613, 616, and 619, or Zoology 617, 618, and 620 or equivalent with permission of the instructor. Limited to graduate students and anatomy majors. Mr. Knouff.

The general histology and cytology of the blood, the connective tissues, the vascular, respiratory and excretory systems.

612. Comparative Histology. Five credit hours. Winter Quarter. Two lectures and nine laboratory hours each week. General prerequisites must include Anatomy 611 or equivalent. Mr. Knouff.

The general histology and cytology of the organs of digestion, absorption, secretion and reproduction with special emphasis on the cytology of the glands of internal secretion.

613. **Comparative Anatomy of the Vertebrates.** Five credit hours. Autumn Quarter. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. A course in evolution is recommended. Mr. Setterfield.

The comparative anatomy of the Elasmobranchs, Amphibians, and mammals as illustrated by the shark, frog, and fetal pig.

616. **Comparative Vertebrate Embryology.** Five credit hours. Spring Quarter. Three lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Anatomy 619 or its equivalent. Mr. Yates.

The development of the chick and pig with special emphasis on the formation of fetal membranes and on mammalian organogenesis.

617. **Elementary Neurology.** Five credit hours. Winter Quarter. Two lectures and six laboratory hours each week. General prerequisites must include Anatomy 611 or equivalent. Mr. Setterfield.

The comparative morphology of the nervous system and the histology of the sense organs of the vertebrates.

618. **Elementary Neurology.** Five credit hours. Spring Quarter. Two lectures and six laboratory hours each week. General prerequisites must include Anatomy 617. Mr. Setterfield.

The study of the microscopic structure of the spinal cord and brain of the higher mammals with special reference to reaction systems.

619. **Comparative Anatomy of the Vertebrates.** Five credit hours. Winter Quarter. Two lectures or recitations and six laboratory hours each week. General prerequisites must include Anatomy 613 or equivalent. Mr. Setterfield.

The anatomy of the mammals with special reference to the cat.

620. **History of Anatomy.** One credit hour. Spring Quarter. One lecture or recitation each week. General prerequisites must include three Quarters of anatomy. Required of all majors and graduate students in anatomy. Mr. Edwards.

A biographical and historical study of the origin and development of the various branches of anatomy.

NOTE: Courses 621 to 700: Open only to students registered in the College of Medicine or in the College of Dentistry.

621-622-623. **Human Anatomy.** Five credit hours. Autumn, Winter, and Spring Quarters. Two lectures or recitations and ten laboratory hours each week. Mr. Baker, Mr. Palmer, Mr. Graves.

The gross anatomy of the thorax and abdomen; of the extremities and perineum; of the head and neck.

624. **Microscopic Anatomy.** Five credit hours. Autumn Quarter. Two recitations, one lecture, and nine laboratory hours each week. Mr. Knouff, Mr. Yates, Mr. Osborn.

The general histology of epithelium, connective tissues, blood and muscle and the special histology of the skeletal, muscular, vascular, integumentary, respiratory, digestive and endocrine systems.

625. **Developmental Anatomy.** Five credit hours. Winter Quarter. Two recitations, one lecture, and nine laboratory hours each week. The lecture hour may be replaced by a seminar hour. Mr. Knouff, Mr. Yates, Mr. Osborn.

The histology of the urinary and reproductive organs and the general embryology of the mammal, with special reference to man.

626. **Neuro-Anatomy.** Five credit hours. Spring Quarter. Two recitations, one lecture, and nine laboratory hours each week. Mr. Palmer, Mr. Graves.

The gross anatomy and histology of the nervous system including sense organs with special reference to the reaction systems.

628. **Special Advanced Anatomy.** Three credit hours. One Quarter. Autumn, Winter, Spring. One conference or lecture and six laboratory hours each week. General prerequisites must include Anatomy 623, 639, or the equivalent. The consent of the instructor is required. Mr. Baker, Mr. Edwards, Mr. Palmer, Mr. Graves.

Students will select or have assigned to them special regions for dissection and study.

638-639. **Human Anatomy.** Seven credit hours. Autumn and Winter Quarters. Two recitations and fifteen laboratory hours each week. Mr. Edwards, Mr. Guthrie.

The gross anatomy of the body with special stress on the anatomy of the head and neck, including the osteology of these parts.

640. **Histology and Embryology.** Five credit hours. Spring Quarter. Three recitations and nine laboratory hours each week. Mr. Knouff, Mr. Yates, Mr. Osborn.

The general histology of the tissues and the special histology of the skeletal, vascular, digestive, respiratory, urinary and nervous systems, including histology of the reproductive system.

641. **Sectional Anatomy.** One credit hour. Autumn Quarter. Three hours of laboratory including lecture or quiz each week. General prerequisites must include Anatomy 638-639-640. Mr. Edwards.

A detailed study of head sections with special attention to the structures concerned in the procedures of oral surgery.

700. **Applied Sectional Anatomy.** Two credit hours. Autumn Quarter. One lecture or recitation and two laboratory hours each week. General prerequisites must include Anatomy 621, 622, and 623. Mr. Graves, Mr. Baker, Mr. Palmer.

The topographical relations of gross anatomy based on surface and sectioned material.

701. **Minor Problems in Anatomy.** Three to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include the equivalent of a major in anatomy or allied departments, including Anatomy 604. The staff.

FOR GRADUATES

900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. **Research in Anatomy.** Autumn, Winter, and Spring Quarters. General prerequisites must include the equivalent of a major in anatomy, including Anatomy 604 and 701. The staff.

ANCIENT HISTORY AND LITERATURE

A program leading to the degree of Master of Arts may be arranged in the combined fields of Ancient History and the Classical Languages. Such a program must be approved by Mr. McDonald of the Department of History, Mr. Titchener of the Department of Classical Languages, and the Dean of the Graduate School.

ANIMAL HUSBANDRY

Office, 203D Plumb Hall

PROFESSORS GAY, KAYS, COFFEY, AND SALISBURY, ASSISTANT PROFESSOR SUTTON, MR. KUNKLE, MR. BRANDT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

All work leading to a graduate degree in this department shall be done under the supervision of a graduate committee which shall consist of the chairman of the department, a member of the staff chosen by the chairman and the student's adviser. This committee shall pass on a candidate's fitness for the work, prescribe his course, and approve his thesis plans before he proceeds.

GENERAL LIVE STOCK PRODUCTION

608. Live Stock Marketing. Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include a course in feeding live stock and Rural Economics 613. Mr. Henning.

The various agencies and organizations involved in the marketing of live stock will be studied. Methods of selling, basis of sale, choice of markets, grade price differentials will be reviewed. The problems of transportation and financing will be considered. Emphasis will be placed on recent developments, concentration, direct to packer marketing, costs of marketing, management, public relations and other problems in live stock marketing.

611. Advanced Live Stock Breeding. Five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. General prerequisites must include a course in heredity, a course in breeding live stock, and permission of the instructor. Mr. Brandt.

The function of the progeny test as a tool for measuring the genetic potentialities of sires and dams; pedigree analysis and other aids to selection; systems of breeding; the utilization of artificial insemination as a means for more rapid live stock improvement; discussions of recent contributions and research in animal breeding.

DAIRY PRODUCTION

614. Methods and Techniques in Animal Husbandry Investigations. Five credit hours. Autumn Quarter. Three lectures and one four-hour laboratory period each week. General prerequisites must include twenty hours in animal husbandry courses and permission of instructor in charge. Mr. Sutton.

A course designed to cover the experimental work being pursued at the leading experiment stations. Experimental procedures of nutrition, milk secretion and reproduction studies.

616. Dairy Inspection Trip. No credit hours. An inspection trip of approximately two weeks, without credit, will be required of all students specializing in dairy production. Mr. Salisbury.

The purpose of this inspection trip is to study at first hand the leading breeding herds, commercial dairies and research programs in operation in the Eastern part of the country.

626. Marketing of Dairy Products. Three credit hours. Winter Quarter. Two lectures each week. General prerequisites must include Rural Economics 613. Mr. McBride.

A study of assembling, transportation and marketing of dairy products, with special reference to Ohio. Attention will be given to changing market areas, producers' cooperative movements and manufacturers' consolidation activities. One or two inspection trips of two or three days will be made.

SPECIAL PROBLEMS

GENERAL LIVE STOCK PRODUCTION AND DAIRY PRODUCTION

701. Special Problems. Three to fifteen credit hours. Given in units of three to five hours a Quarter for one or more Quarters. Autumn, Winter, Spring. Mr. Gay, Mr. Kays, Mr. Coffey, Mr. Salisbury, Mr. Sutton, Mr. Kunkle, Mr. Brandt.

Special assignments in the advanced phases of any of the lines of animal and dairy production and meats. Students will elect work in desired subjects after conference with the instructor in charge.

NOTE: Students desiring work in animal nutrition, see Agricultural Chemistry 601, 607, 608.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

This will include at least two years' study of the types and breeding of live stock with collateral work in the principles of breeding, feeding and management.

950. Research in Animal Husbandry. Autumn, Winter, and Spring Quarters.

Research work in Animal Husbandry is conducted under the direction of Mr. Gay, Mr. Kays, Mr. Coffey; in Dairy Production under the direction of Mr. Salisbury; in Genetics under the direction of Mr. Brandt; in Nutrition under the direction of Mr. Sutton; and in Meats under the direction of Mr. Gay, Mr. Kunkle.

ART

(See Fine Arts)

ASTRONOMY

(See Physics and Astronomy)

BACTERIOLOGY

Office, 210 Pharmacy and Bacteriology Building

PROFESSORS HUDSON, MORREY (EMERITUS), AND STARIN, ASSOCIATE PROFESSOR WOOLPERT, BIRKELAND, MARKHAM, AND STAHLY, MR. WEISER, MR. HOLTMAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The prerequisites for all courses in this group consist of fifteen hours of biological sciences and fifteen hours of chemistry in addition to any other prerequisites stated in the description of the courses.

607. General Bacteriology. Five credit hours. One Quarter. Autumn and Spring. Two lectures, one recitation, and three two-hour laboratory periods each week. Mr. Stahly, Mr. Weiser, Mr. Holtman.

This course is a prerequisite to all elective courses in the department and is designed to prepare for special work. The lectures consider the botanical relationships of bacteria, their morphology, classification, effect of physical and chemical environment, action on food material, etc. The laboratory work includes preparation of the ordinary culture media and making of cultures on these media, staining methods, and some typical biochemical actions.

Not open for graduate credit to students majoring in bacteriology.

608. Introduction to Pathogenic Bacteriology. Three credit hours. Winter Quarter. Three class periods each week. General prerequisites must include Bacteriology 607. Mr. Birkeland.

A general course designed to acquaint students with those bacteria causing disease in man: their habitats and modes of transmission, and an elementary consideration of the immunological processes involved. Designed primarily for students who desire a general knowledge of the field and not for students majoring in bacteriology.

†609. Introduction to Pathogenic Bacteriology. Three credit hours. General prerequisites must include Bacteriology 607.

Laboratory work on some of the important bacteria producing disease in man, including cultural and staining properties, methods of diagnosis, animal inoculation.

610. Dairy Bacteriology. Three credit hours. Winter Quarter. Three class periods each week. General prerequisites must include Bacteriology 607. Mr. Weiser.

Sources and kinds of bacteria in milk and in normal milk fermentation. Uses of bacteria in butter making, and of bacteria and fungi in cheese making. Bacteria involved in unnatural milk fermentation and methods of control.

† Not given during the academic year, 1940-1941.

611. Dairy Bacteriology. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. Bacteriology 607 and 610 must be included in the general prerequisites. However, 610 may be taken concurrently. Mr. Weiser.

Laboratory work on the organisms discussed in Bacteriology 610.

614. Bacteriology of Food, Water, and Sewage. Five credit hours. Winter Quarter. Two class periods and three two-hour laboratory periods each week. General prerequisites must include Bacteriology 607. A previous course in pathogenic bacteriology is recommended or may be taken concurrently. Mr. Holtman.

A study of the effects of microorganisms on foods, and methods of food preservation. Bacterial flora of water and sewage in relation to water purification and sewage disposal.

Particular emphasis is placed upon the role of sanitation and public health regulations in the control of infectious diseases transmitted through food, water, and sewage.

617. Immunology. Three credit hours. One Quarter. Autumn and Spring. Three class periods each week. General prerequisites must include Bacteriology 607 and 608, or equivalent. Mr. Starin.

A discussion of the general principles of immunity, including toxins and antitoxins, bactericidal substances, agglutinins, precipitins, opsonins, etc.

618. Immunology. Three credit hours. One Quarter. Autumn and Spring. Three three-hour laboratory periods each week. General prerequisites must include Bacteriology 607 and 608, or equivalent. Mr. Starin.

Laboratory work in the preparation of toxins, antitoxins, antibacterial substances, bacterial vaccines, and in the serological methods of diagnosis.

619. Pathogenic Protozoology. Three credit hours. Spring Quarter. Three class periods each week. General prerequisites must include Bacteriology 607, 608, and 609, or equivalents. Mr. Markham.

The various pathogenic protozoa of man and domestic game animals are considered, with special attention to amebae and plasmodia of malaria. Emphasis is placed on the principles of parasitism involved and on insect transmission.

621. Advanced Dairy Bacteriology. Three credit hours. Winter Quarter. General prerequisites must include Bacteriology 607, 610, and 611, or equivalents. Mr. Weiser.

Research in any of the lines discussed in Bacteriology 610.

624. History of Bacteriology and Allied Fields. Three credit hours. Spring Quarter. Lectures, conferences, and library work. General prerequisites must include Bacteriology 607, 655, 656, 657, 658, and 617, or equivalents. Mr. Starin.

This course is designed for students majoring in bacteriology. Its purpose is to acquaint the student with the historical development of bacteriology, immunology, and allied fields, to introduce him to the principal workers in the various fields, and to show how their contributions are related to our present concepts.

Not open to students who have credit for Bacteriology 627.

626. Special Technique in Pathogenic Bacteriology. Five credit hours. Winter Quarter. Conferences, library, and laboratory work. General prerequisites must include Bacteriology 607, 608, and 609, or equivalents. Mr. Starin.

A course in technique in which the student is thoroughly trained in working with such material and methods as are encountered in board of health and hospital laboratories.

633. Advanced General Bacteriology. Five credit hours. Winter Quarter. Two lectures, one recitation, and three two-hour laboratory periods each week. General prerequisites must include Bacteriology 607. Mr. Stahly.

A course concerned with an advanced and detailed study of the basic phenomena of bacterial morphology, composition, growth, cultivation, variation, and classification.

635. Physiology of Bacteria. Three credit hours. Autumn Quarter. Three class periods each week. General prerequisites must include Bacteriology 607 and two Quarters of organic chemistry. Mr. Stahly.

Studies of bacterial metabolism including enzymes, mechanisms of biochemical changes and products. Uses of bacteria in fermentation industries.

649. Filterable Viruses. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Bacteriology 607, 655, 656, 657, 658, 617, and 618, or equivalents. Mr. Hudson.

Lecture and demonstration course on the nature and action of filterable viruses as ultramicroscopic parasites of man, animals and plants.

655. Pathogenic Bacteriology. Three credit hours. Winter Quarter. Three class periods each week. General prerequisites must include Bacteriology 607. Mr. Starin.

A study of some of the important organisms causing disease in man. Modes of transmission, methods of protection against infections, and immunological relationships. Designed for students majoring in bacteriology, those preparing for work in diagnostic laboratories, and others desiring a more comprehensive knowledge than is provided in Bacteriology 608.

Not open to students who have credit for Bacteriology 608.

656. Pathogenic Bacteriology. Three credit hours. Winter Quarter. Three three-hour laboratory periods each week. General prerequisites must include Bacteriology 607. Mr. Starin, Mr. Stahly.

Laboratory work with some important bacteria causing disease in man. Includes study of the cultural and staining characteristics, methods of identification and diagnosis, and animal experimentation. Designed to accompany Bacteriology 655.

Not open to students who have credit for Bacteriology 609.

657. Pathogenic Bacteriology. Three credit hours. Spring Quarter. Three class periods each week. Designed for students majoring in bacteriology. General prerequisites must include Bacteriology 607, 655, and 656, or equivalents. Mr. Starin.

A continuation of Bacteriology 655, including a study of those organisms pathogenic for man, not covered in the preceding course. Modes of transmission, methods of protection against infection, and immunological relationships. Lectures, conferences, and reports.

Not open to students who have credit for Bacteriology 625 or 631.

658. Pathogenic Bacteriology. Three credit hours. Spring Quarter. Three three-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 655, and 656, or equivalents. Concurrent with Bacteriology 657. Mr. Starin, Mr. Markham.

A continuation of Bacteriology 656.

Not open to students who have credit for Bacteriology 625 or 632.

701. Minor Investigations. Three or five credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include Bacteriology 607, 655, 656, 657, 658, 617, and 618, or equivalents. Department staff.

This course is designed for such students as have completed the equivalent of two years' work in bacteriology and are still undergraduates. The work will be outlined by the instructor in charge to meet the individual student's needs.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Students intending to specialize in bacteriology should take in addition to their major work, courses in botany, pathology, anatomy, physiology, zoology, dairying, or soils, depending upon the field of specialization. The general prerequisites also include an acceptable course in organic chemistry.

807-808-809. Seminar in Bacteriology. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in bacteriology. Department staff.

950. Research in Bacteriology. Autumn, Winter, and Spring Quarters. General prerequisites must include acceptable courses in the chosen field of research. Department staff.

BOTANY

Office, 102 Botany and Zoology Building

PROFESSORS TRANSEAU, STOVER, AND SAMPSON, ASSOCIATE PROFESSORS WALLER, MEYER, PIERSTORFF, AND BLAYDES, ASSISTANT PROFESSOR FREELAND, MISS LAMPE, MR. SCOFIELD, MR. TAFT, MR. WOLFE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Plant Ecology. Five credit hours. Autumn Quarter. Three lectures and one three-hour laboratory period each week. Mr. Transeau, Mr. Wolfe.

Lectures on the vegetation of the Eastern United States with special reference to the plant associations and formations of Ohio. Field work on the associations of the vicinity of Columbus and their successions. Reading of important literature. Several Saturday field trips.

602. Plant Ecology. Five credit hours. Spring Quarter. Three lectures and one three-hour laboratory period each week. General prerequisites must include Botany 601. Mr. Transeau, Mr. Wolfe.

General principles of ecological plant geography. A discussion of associations and successions of the major divisions of the vegetation of North America. Assigned readings of the more important literature. Several Saturday field trips.

605. Plant Physiology. Five credit hours. One Quarter. Autumn and Winter. Three lectures and two two-hour laboratory periods each week. Mr. Meyer, Mr. Freeland, Mr. Scofield.

The physiology of absorption and movement of water, salts, and gases in plants. The properties of water, solutions, and colloids; permeability, diffusion, absorption, and transpiration, and the movement of water in plants.

606. Plant Physiology. Five credit hours. One Quarter. Winter and Spring. Three lectures and two two-hour laboratory periods each week. General prerequisites must include Botany 605. Mr. Meyer, Mr. Freeland, Mr. Scofield.

The physiology of nutrition, growth and movement; photosynthesis, other syntheses, enzymes, digestion, translocation, accumulation, assimilation, respiration, fermentation, growth and movement.

611. Evolution of Plants. Three credit hours. Spring Quarter. Lectures and assigned readings. Miss Lampe.

The evolution of the plant kingdom with a general discussion of the problems and factors involved.

613. General Morphology of Thallophytes and Bryophytes. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Blaydes.

A study of the life histories of the algae, fungi, liverworts, and mosses. The laboratory work will consist of a study of the vegetative and reproductive structures of the several groups.

614. General Morphology of the Pteridophytes and Spermatophytes. Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. Miss Lampe.

A study of the comparative structures and life histories of the ferns, gymnosperms, and angiosperms, giving particular attention to the structure and development of seed plants.

615. Plant Microtechnic. Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Blaydes.

Principles and methods of killing, fixing, imbedding, sectioning, staining, and mounting plant materials for microscopic study.

617. Plant Microchemistry. Five credit hours. Autumn Quarter. One lecture and three two-hour laboratory periods each week. General prerequisites

must include Botany 605 and 606. Desirable antecedents, general inorganic and organic chemistry. Mr. Sampson.

The identification *in situ* of organic and inorganic substances found in plant tissues by microchemical methods. These methods are of special value in determining plant substances within the cells and in the study of physical and chemical changes accompanying plant processes and plant responses. This applies particularly to the numerous local regions in plants too small to be attacked by the test-tube method of tissue analysis.

619. Economic Botany. Five credit hours. Autumn Quarter. Four lectures and one two-hour laboratory period each week. Desirable, concurrently or as antecedent, ecology or advanced geography. Consult instructor before registering. Mr. Waller.

The world's sources of food, fibers, oils, rubber and other products examined from the standpoint of their ecology. In the laboratory the study of raw materials and products will illustrate ways plants are used by man.

632. Physiological Methods. Three credit hours. Spring Quarter. Six laboratory hours each week. Botany 605-606 must be included in the general prerequisites or taken concurrently, except by special permission of the instructor. Mr. Meyer, Mr. Freeland.

Methods of measuring the physical factors of the environment that influence plant growth and development, both under laboratory and field conditions. Methods of growing plants under controlled conditions for experimental work. Conferences, readings, and laboratory work.

633. Physiological Methods. Three credit hours. Winter Quarter. Six laboratory hours each week. Botany 605-606 must be included in the general prerequisites or taken concurrently, except by special permission of the instructor. Mr. Meyer, Mr. Scofield.

A laboratory course in the methods of plant physiology such as measurements of H-ion concentration, osmotic values, permeability, enzyme activity and the processes of transpiration, respiration, and photosynthesis. Conferences, readings and laboratory work.

634. Plant Growth. Three credit hours. Spring Quarter. Three lectures each week. Consult instructor before registering. Mr. Sampson.

A study of the physiology of growth. Special attention is given to the interrelated effects of internal and external factors upon growth, movement and reproduction in plants. Bibliographies and reviews of literature.

635 Plant Genetics. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include a course in heredity. Mr. Waller.

The study of heredity in plants. Theories of the transmission of heritable characteristics. Research methods in the study of inheritance.

***637. Plant Cytology.** Three credit hours. Spring Quarter. Three two-hour laboratory periods each week. General prerequisites must include four Quarters of biology. Given biennially, alternating with Botany 640. Miss Lampe.

The structure, ontogeny, divisions and fusions of plant cells.

NOTE: Either 637 or 640 will be given in 1940-1941, depending on the relative number of applications. Students planning to take either course should consult Mr. Blaydes.

640. Plant Anatomy. Three credit hours. Spring Quarter. Three two-hour laboratory periods each week. General prerequisites must include four Quarters of biology. Given biennially, alternating with Botany 637. Mr. Blaydes.

The origin and development of the organs, and tissue systems of vascular plants, and comparative study of the structures of roots, stems, leaves, flowers, and fruits. This course is a desirable antecedent to advanced work in physiology and pathology.

NOTE: Either 637 or 640 will be given in 1940-1941, depending on the relative number of applications. Students planning to take either course should consult Mr. Blaydes.

653. Mycology. Three credit hours. Autumn Quarter. Three two-hour laboratory periods each week. Mr. Stover.

Study of the classification, structure, reproduction, and life histories of the Basidiomycetes, including the rusts and smuts. Collection and identification of fungi available during the autumn months, edible and poisonous mushrooms, wood-destroying fungi, and other interesting species.

* Not given in 1940-1941.

654. Mycology. Three credit hours. Spring Quarter. Three two-hour laboratory periods each week. Mr. Stover, Mr. Pierstorff.

Study of the classification, structure, reproduction, and life histories of the Phycomycetes and Ascomycetes. Attention is given to the collection and identification of the fungi available during the spring months, including molds, mushrooms, and plant disease fungi.

656. Advanced Plant Pathology. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. General prerequisites must include a course in general plant pathology. Mr. Stover, Mr. Pierstorff.

Designed for students in botany, entomology, horticulture, and agronomy. Each student may select for study the diseases of those plants in which he is primarily interested.

665. Freshwater Algae. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. General prerequisites must include six Quarters of biological work. Consent of the instructor is required. Mr. Taft.

Conference, laboratory, and library course on the classification, morphology, and ecological relations of the freshwater algae.

701. Special Problems: Taxonomy, Morphology, Physiology, Cytology, and Anatomy. Two to five credit hours each Quarter. Autumn, Winter, Spring. The staff.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 683.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Students majoring in plant pathology must have acceptable courses in microchemistry, bacteriology and plant genetics, in addition to the undergraduate courses in pathology. Advanced work in plant physiology presupposes at least an elementary course in organic chemistry. With plant physiology, suitable courses may be elected in physical, organic and plant chemistry, and in soil investigations. With plant pathology, various courses in entomology and bacteriology are available.

***807. Principles of Taxonomy: Pteridophytes and Gymnosperms.** Three credit hours. Autumn Quarter. Given in alternate years.

A detailed study of phylogeny and evolutionary series based on floral structure and organography.

***808. Principles of Taxonomy: Monocotyls.** Three credit hours. Winter Quarter. Given in alternate years. General prerequisites must include Botany 807.

A study of the groups of monocotyls with special consideration of the taxonomy of the grasses and of the lack of correlation between taxonomic characters and environment.

***809. Principles of Taxonomy: Dicotyls.** Three credit hours. Spring Quarter. Given in alternate years. General prerequisites must include Botany 808.

A general consideration of all the groups of dicotyls, of the origin of angiosperms, and of the progressive or serial development of characters.

810. Botanical Colloquium. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in botany. All instructors.

***812. Seminar in the History of Botany.** One credit hour. Winter Quarter. Recommended for all graduate students majoring in botany. Mr. Waller.

950. Research in Botany. Autumn, Winter, and Spring Quarters.

Research work in taxonomy, morphology, anatomy, cytology, physiology, genetics, plant pathology, or economic botany is offered by various members of the staff. Mr. Transeau, Mr. Stover, Mr. Sampson, Mr. Pierstorff, Mr. Waller, Mr. Meyer, Mr. Blaydes, Mr. Freeland, Miss Lampe, Mr. Taft, Mr. Scofield.

* Not given in 1940-1941.

BUREAU OF BUSINESS RESEARCH
Office, 206 Commerce Building

PROFESSOR BOOTHE, ASSISTANT PROFESSORS YOCUM AND KELLOGG

The purposes of the Bureau of Business Research are to facilitate the research activities of the faculty and the graduate students of the College of Commerce and Administration and at the same time to make cooperative studies in business and industry which will be valuable in the commercial and industrial development of the state. Through its research activities and its monthly business review, *The Bulletin of Business Research*, the Bureau maintains continuous contacts with representatives of trade and industry in the state, as well as with research and administrative departments of the Federal, State, and local governments.

For many years the Bureau of Business Research has served as the central coordinating agency for research in problems of business operation and of basic economic trends in the state. The Bureau sponsors each year a state and regional Conference of Statisticians on Business Research.

The Bureau maintains physical equipment such as adding and calculating machines, tabulating machines, typewriters, duplicating equipment, etc., as well as a technical and clerical staff. These facilities, in so far as possible, are available to members of the instructional staffs of the various departments of the College of Commerce and to graduate students where researches of a quantitative nature can be undertaken only with the cooperation of a research organization. There is also maintained a specialized research library in the field of business and industrial statistics. Researches which meet the standards of the Bureau are published as books, monographs, or special studies of the Bureau and given widespread circulation by the Bureau.

BUREAU OF EDUCATIONAL RESEARCH
Office, 200, 201 Arps Hall

PROFESSORS CHARTERS, HOLY, ANDERSON, AIKIN, AND DALE, ASSOCIATE PROFESSOR RATHS, ASSISTANT PROFESSORS GILES, LOWDERMILK, MacLATCHY, McCUTCHEN MOONEY, O'STEEN, ROWLAND, TYLER, WOELFEL, AND ZECHIEL, MISS SEEGER, RESEARCH ASSOCIATES AND ASSISTANTS

The purpose of the Bureau of Educational Research is to promote the scientific investigation of educational problems both in the University and in the public schools of the State. It constitutes an agency for cooperative effort among all the school people of Ohio. The facilities of the Bureau are available to all students, faculty members, and school people of Ohio.

Library. The research library contains large quantities of material in the form of manuscripts, pamphlets, bulletins, reports, modern textbooks for elementary and high-school grades, and educational periodicals. This library is in charge of a reference librarian, and her services together with the library material, are utilized in the preparation of bibliographies and reports on problems presented by those engaged in educational work. This applies to students and faculty members as well as those engaged in the work of the public schools. Unless the problem requires extensive investigation, the service will be rendered without charge.

Courses. In order to make the resources of the Bureau serve for research purposes, students desiring to work in the Bureau may register in certain courses listed in the departments of Education and Psychology. Courses must be approved by the chairman of the department and by the Director of the Bureau. Such students will be under the direction and supervision of the Bureau staff members.

Research Problems. Students taking such courses are given practical problems upon which to work. According to the nature and exacting character of the problem and the scholastic status of the student, he may be registered in either of two groups of courses, as follows:

MINOR PROBLEMS. Two to four credit hours. Investigation of minor problems.
Education 600
Psychology 650

INDIVIDUAL PROBLEMS. Two to ten credit hours. Investigation of problems leading to preparation of theses for advanced degrees.
Education 950
Psychology 950

NOTE: Descriptions of these courses, prerequisites, and the divisions into which the two Education courses are divided will be found under the department announcements.

BUREAU OF SPECIAL AND ADULT EDUCATION

Office, 321 Arps Hall

PROFESSORS BERRY AND NISONGER, ASSOCIATE PROFESSOR ROSEBROOK

The function of the Bureau of Special and Adult Education is to promote the education of all types of exceptional children (the handicapped and the gifted) and to further the work of adult education.

Qualified students in training may secure under adequate supervision practical field experience in special or adult education, or in psycho-educational work.

Students interested in the work of this Bureau should confer with the Director.

SPECIAL EDUCATION

Field Service. The objectives of field service are as follows: to assist the smaller communities in organizing the work of special education; to serve in an advisory capacity the communities in which special education has already been organized; and to cooperate with state and local organizations in formulating a state program for the protection, treatment and training of all types of exceptional children and for the removal of the causes that handicap children.

Teacher Training. Only persons who have had successful experience in teaching normal children should prepare to teach exceptional children. A student who wishes to prepare to teach mentally retarded children, behavior problem children, or children defective in speech should select courses from those recommended below.

Candidates for the degree of Bachelor of Science in Education interested in teaching exceptional children should register in the Curriculum in Elementary Education. In this curriculum students are required to elect 20 additional hours in some one selected field at the junior-senior level. Those interested in special education may meet this requirement by choosing electives from the courses listed below.

All types of exceptional children

Psychology 609. Exceptional Children: General Survey
Psychology 613. Mental and Educational Tests
Psychology 615. Psycho-Educational Diagnosis and Treatment
Psychology 616. Individual Testing by the Binet-Simon Method
Psychology 618. Clinical Tests
Psychology 619. Psychological Clinic
Psychology 661. Psycho-Educational Problems
Psychology 669. Gifted Children
Psychology 683. Psychology of Reading
Education 764. Supervised Teaching in Special Classes
Education 767. Administration of Special Education
Education 897. Seminar in Special Education

Mentally retarded children

Psychology 611. Mentally Deficient Children
Psychology 622. Delinquent Children
Education 458. General Wood and Metal Work
Education 765. Principles and Methods of Teaching the Mentally Retarded

Behavior problem children

Psychology 622. Delinquent Children
Psychology 634. Criminal and Legal Psychology
Psychology 641. Abnormal Psychology
Education 766. Principles and Methods of Teaching Behavior Problem Children
Sociology 625. The Criminal
Social Administration 840. Probation and Parole

Children defective in speech

Speech 656. Visual Hearing Techniques
Speech 692. Clinical Practice in Speech Correction
Speech 694. Speech Disorders Survey
Speech 816. Speech Pathology

Research. Students interested in research problems connected with the work of the Bureau of Special and Adult Education may register in any of the following courses:

Psychology 650. Minor Problems
Psychology 950. Research in Psychology
Education 600-g. Minor Problems
Education 950-j. Research in Education
Speech 700. Minor Problems in Speech
Speech 950. Research in Speech

ADULT EDUCATION

Field Service. The aims of field service are as follows: to aid in the organization of adult study groups; to assist organized groups in formulating programs of study; to prepare and issue courses of study, bulletins and other materials for the use of adult groups; and to cooperate with state and local organizations in furthering the work of adult education.

University Courses. Students interested in taking work in adult education may enroll in any of the following courses:

Education 600-g. Minor Problems
Education 770. Adult Education
Education 898. Planning Community Adult Education Programs
Education 950-j. Research in Education
Psychology 650. Minor Problems
Psychology 670. Psychological Problems of Adult Life
Psychology 679. Psychology of Public Attitudes
Psychology 950. Research in Psychology
Agricultural Extension 501. Extension Methods
Agricultural Extension 600. Extension Education

NOTE: Description of the courses listed above will be found under the department announcements, with the exception of those at the "800" and "900" level which are described in the Graduate School Bulletin only. See College of Agriculture Bulletin for Agricultural Extension 501 and 600.

BUSINESS ORGANIZATION
Office, 107 Commerce Building

PROFESSORS MAYNARD, WEIDLER, HOAGLAND, DICE, HELD, DUFFUS, BECKMAN, AND DAVIS, ASSOCIATE PROFESSORS PIKE, REEDER, CORDELL, DAMERON, AND POWER, ASSISTANT PROFESSORS RIDDLE, DONALDSON, KIMBALL, KELLOGG, C. W. BOWERS, BURLEY, LEY, NOLEN, AND JUCIUS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40. The general prerequisites must include a fundamental course in economics.

614. Business Statistics. Four credit hours. One Quarter. Winter and Spring. Three class meetings and one two-hour laboratory period each week. General prerequisites must include courses in economic statistics and college algebra. Mr. Smart.

Price and production indexes. Analysis of time series. Linear correlation applied to economic and business problems.

621. Business Law: Contracts. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. Power, Mr. C. W. Bowers, Mr. Ley.

A course in the law of contracts for the student of business, including the study of the fundamentals of legally binding agreements between persons, and their enforcement.

622. Business Law for Engineers and Architects. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. C. W. Bowers, Mr. Ley.

A course in the law of contracts with special reference to engineering and architectural problems and with incidental reference to certain other phases of the law that most closely affect the engineer and architect.

623. Business Law: Agency and Sales. Three credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 621. Mr. Pike, Mr. Ley.

A course in the law of agency and sales for the student of business. The fundamentals of the law governing business transactions of persons through agents and the sale of personal property. A continuation of Business Organization 621.

625. Business Law: Negotiable Instruments. Three credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 621. Mr. C. W. Bowers, Mr. Ley.

A course in the laws governing bills of exchange, promissory notes and checks designed to guide the business man in his daily transactions with such instruments.

627. Business Law: Partnerships and Corporations. Three credit hours. One Quarter. Autumn and Spring. General prerequisites must include Business Organization 621. Mr. Pike.

A course designed to give the student of business a practical working knowledge of important laws governing the formation and operation of partnerships and corporations.

629. Business Law: Legal Aspects of Credits and Collections. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 621 and 709. Mr. Pike.

The course includes in part a study of property as the source of collections and as security for debts; legal instruments of the security type such as mortgage and conditional sales, etc., types of legal procedure in the courts, and duties of the officers thereof with which the creditor is most concerned.

***631. Business Law: The Law of Banks and Banking.** Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 621 and 625. Mr. Pike.

A study of legal principles governing the operation of banks and trust departments.

633. Governmental Agencies and Business. Three credit hours. Winter Quarter. Three meetings each week. Mr. Power.

A study of the various administrative agencies created by the local, state, and federal governments for the regulation of business from the viewpoint of the student of business. Particular consideration is given to the organization, jurisdiction and procedure of such administrative agencies and their relations to business.

640. Corporate Organization and Control. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. Mr. Donaldson.

Types of business enterprise; the corporation; rights, duties, obligations, and liabilities of stockholders, directors, and officers.

642. Real Estate Principles. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. Mr. Hoagland.

Principles of real property ownership and real estate practice; types of deeds, leases, restrictions; real estate brokerage, selling, advertising; property management; subdividing and developing; zoning and its effects.

643. Real Estate Finance. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 642. Mr. Hoagland.

Methods available for financing the ownership or occupancy of real property. Real estate and real estate paper as a field of investment. Problems involved in appraisal and practical methods of appraisal.

* Not given in 1940-1941.

644. Real Estate Problems. One to three credit hours. One Quarter. Autumn, Winter, Spring. Permission of instructor must be obtained. Mr. Hoagland.

Individual research in the field of real estate, designed for students primarily interested in real estate investments and in possibilities of the real estate business.

645. Trade Associations. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hoagland, Mr. Duffus.

The nature and function of trade associations, and their relation to business and to government.

650. Corporation Finance. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Duffus, Mr. Donaldson, Mr. Riddle, Mr. Kimball.

Financial structure and problems of modern business corporations.

Not open to students who have credit for or who are taking Economics 616.

652. Industrial Finance. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include Business Organization 650. Mr. Hoagland, Mr. Kimball.

A study of specific cases involving financial decisions and operations.

***653. Industrial Consolidations and Mergers.** Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include Business Organization 640 or 650. Mr. Hoagland.

Historical and analytical study of industrial consolidations and mergers.

655. Principles of Investment. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. General prerequisites must include Economics 616 or Business Organization 650. Mr. Hoagland, Mr. Riddle.

Functions of investment; economic basis of investment; basic elements of investment; investment programs; problems of personal finance; field of investment. All these topics are considered from the point of view of the investor.

Not open to students who have credit for Business Organization 658.

656. Railroad and Public Utility Finance. Three credit hours. One Quarter. Autumn and Winter. Three class meetings each week. General prerequisites must include Business Organization 650. Mr. Duffus, Mr. Riddle.

Financial problems peculiar to public service industries. American railroads and utilities as fields for investment and speculation and their financial administration under state and federal regulation.

657. Investment Analysis. Three credit hours. Winter Quarter. Three meetings each week. General prerequisites must include Business Organization 650. Mr. Riddle.

Principles and procedure of investment analysis; principles and technique of selecting corporation and government bonds, real estate obligations, and common stocks; the interpretation of financial factors; investments and business conditions; practical applications.

659. Investment Banking. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 650. Mr. Riddle.

Principles of long-period banking credit; process of investment banking; functions and operations of investment banking institutions; trends and problems of investment banking.

660. The Stock Market. Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. General prerequisites must include Business Organization 650 and a course in money and banking. Mr. Dice, Mr. Donaldson.

The New York Stock Exchange; brokerage houses, methods of trading; business cycles and movements of stock prices; regulation of stock issue and manipulation.

662. The Money Market. Three credit hours. Spring Quarter. General prerequisites must include a course in money and banking. Mr. Dice.

New York as a money market; the acceptance and commercial paper; brokers' loans; business loans; interest and discount rates; control of the supply of money through the Federal Reserve System; present problems and trends.

* Not given in 1940-1941.

665. Foreign Exchange. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a course in money and banking. Mr. Willit.

A study of the theory and practices of foreign exchange from the standpoint of both bankers and foreign traders. The relationship of foreign exchange to international trade and financial problems is included.

666. Practice Work in Banking. One to three hours each Quarter with total credit not to exceed six credit hours. Autumn, Winter, Spring. Students are admitted on the suggestion of the instructor in charge of cooperation with the banks concerned. Mr. Dice.

Students do actual work in a bank. Each student will attend conferences in regard to his work and make reports based on the different bank operations.

670-*671. Bank Organization and Management. One to three credit hours. Winter and Spring Quarters. Each Quarter may be taken separately. 670, given in alternate years. General prerequisites must include a course in money and banking, Business Organization 650, and, for 671, Accounting 616. Mr. Dice.

This course deals with the organization and practical operation of banks; their relations to the Federal Reserve System; government control; trends and required reforms.

***674. Savings and Trust Institutions.** Three credit hours. Autumn Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include a course in money and banking. Mr. Willit.

The practical operations and economic significance of the building and loan associations, savings banks, trust companies, and various other institutions are studied.

680. Industrial Organization and Management. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Davis, Mr. Jucius.

An examination of the basic fundamentals of management underlying the solution of problems of organization and operation in all business enterprise, followed by their application to such specific fields of industrial management as production, materials, personnel, etc.

684. Industrial Management Field Work. Three to six credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 680. Mr. Davis, Mr. Jucius.

685. Purchasing, Stores, and Inventory Control. Three credit hours. One Quarter. Winter and Spring. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis, Mr. Jucius.

The organization, management and control of materials in industries. Treats particularly of the organization and functions of the purchasing, stores, and material-handling and controlling departments and those parts of the planning, accounting, production, and other departments directly affecting the control of materials.

686. Personnel Organization and Management. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis.

The organization, management, and control of personnel in industry. Treats particularly the functions and practice which come within the scope of hiring, force maintenance, industrial education and welfare.

687. Production Organization and Management. Three credit hours. One Quarter. Autumn and Winter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis, Mr. Jucius.

The organization, management, and control of production in industry. Treats these largely from the point of view of shop management.

688. Work Standards and Labor Compensation. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Davis.

A critical examination of policy, functionalization, organization morale, business procedure, standardization, and other fundamental concepts in business organization and operation, as they enter into the practical determination of good working conditions, a fair day's work, and good wages.

* Not given in 1940-1941.

691. Office Organization and Management. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 680. Mr. Jucius.

Mechanics of administration. Office management. Standards, tools, forms, equipment, office machinery, and standard methods. Special office problems of different departments, and of multi-plant organization.

700. Marketing. Five credit hours. One Quarter. Autumn, Winter, Spring. Five class meetings each week. Mr. Beckman, Mr. Reeder, Mr. Cordell, Mr. Maynard, Mr. Burley, Mr. Nolen.

A general but critical survey of the field of marketing. Consumer demand in relation to the marketing machinery. Functions, methods, policies, marketing costs, and problems of the farmer, manufacturer, wholesaler, commission merchant, broker, retailer and other middlemen. Emphasis on principles, trends, and policies in relation to marketing efficiency.

703. Business Research. Three credit hours. Autumn Quarter. Two lectures and one two-hour laboratory period each week. General prerequisites must include Business Organization 650, 680, and 700, a course in elementary economic statistics, and permission of the instructor. Mr. Burley, Mr. Kellogg.

Business research treated from the viewpoint of the business executive. The course deals with the discovery and utilization of existing information realting to problems of analysis other than accounting. It also includes a study of the fundamentals of primary data research, sampling, and schedule construction.

Not open to students who have credit for Business Organization 702.

704. Problems in Marketing Research. Three credit hours. Winter Quarter. Two lectures and one two-hour laboratory period each week. General prerequisites must include Business Organization 702 or 703. Mr. Burley, Mr. Kellogg.

Problems in marketing research are studied as a basis for the development of market organizations, and the formulation of policies and plans. Field work, including schedule construction, sampling, field testing, editing, tabulation, and analysis as applied to a specific marketing problems.

705. Retail Merchandising. Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700 and elementary courses in Accounting. Mr. Maynard, Mr. Dameron.

A consideration of the organization and management of retail establishments: store location; store organization; buying; receiving; stockkeeping; inventories; sales systems; store policies; services; expenses and profits; deliveries; personnel problems, etc.

706. Wholesaling. Four credit hours. One Quarter. Autumn and Spring. Four class meetings each week. General prerequisites must include Business Organization 700 and elementary courses in Accounting. Mr. Beckman.

The field of wholesaling; types and classes of wholesale organizations; tendencies in wholesaling; wholesale centers. Organization and management of wholesale establishments including location, purchasing, receiving, stock control, advertising, selling, order filling, traffic management, credit granting, expenses, profits, etc.

709. Credits and Collections. Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700 and elementary courses in Accounting. Mr. Beckman, Mr. Cordell.

Credit—nature, functions, instruments, classes, risk, organization and management. Sources of credit information. Collection methods and policies. Extensions, compositions, adjustments, receiverships, bankruptcy, credit insurance, credit limits, credit and collection control.

710. Advanced Credit Problems. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Business Organization 709. Mr. Beckman, Mr. Cordell, Mr. Kimball.

A course designed for students interested in mercantile or retail credit and in credit management as a career. Readings, cases, and problems. Emphasis on credit analysis and on term reports covering individual research of subjects chosen from the standpoint of each student's special interests.

*711. **Retail Selling.** Three credit hours. General prerequisites must include courses in the theory and practices in secondary education, a course in educational psychology, and Business Organization 700 or equivalent.

Effective retail selling technique will be discussed in this course. The material will be presented by lectures, textbooks, class demonstrations, motion and still films, and will include a discussion of methods of teaching this subject in the public schools and colleges. Emphasis will be placed on the influence of the consumer movement on sales methods. Special reference will be given to the organization and teaching of courses supported by the funds released by the George-Deen law.

Not open to students who have credit for Business Organization 712.

712. **Salesmanship and Sales Management.** Four credit hours. One Quarter. Autumn, Winter, Spring. Four class meetings each week. General prerequisites must include Business Organization 700 and elementary courses in Accounting. Mr. Maynard, Mr. Nolen.

Salesmanship topics: knowledge of goods and markets; buying motives; sales planning; study of customers and their wants; meeting objections; closing.

Sales management problems: sales organization; planning; territories; quotas; sales research; selecting and training salesmen; compensation; expenses, stimulation and supervision of salesmen.

716. **Principles of Advertising.** Three credit hours. One Quarter. Autumn, Winter, Spring. Three class meetings each week. General prerequisites must include Business Organization 700 and elementary courses in psychology. Mr. Dameron, Mr. Cordell.

A general course in advertising which considers the use of advertising and sales promotion in the sale of goods and services. Advertising agencies. Advertising departments. Copy, layout, illustrations, typography, engraving. Advertising media. Radio advertising. Advertising research. National advertising campaigns. Economics of advertising.

717. **Advertising Practice.** Three credit hours. Winter Quarter. Two class meetings and one two-hour laboratory period each week. General prerequisites must include Business Organization 716. Mr. Dameron.

The technique of advertising with emphasis on copy and layout. Consumer and trade advertising in general markets. Advertising production. Advertising technique in relation to selling problems. Preparation of radio advertising programs and technique of commercial announcements.

Laboratory assignments based upon practical advertising problems.

719. **Retail Advertising and Sales Promotion.** Four credit hours. Spring Quarter. Two class meetings and one two-hour laboratory period each week. General prerequisites must include Business Organization 717 or the permission of the instructor. Mr. Dameron.

Advertising department of a retail store. Importance of newspaper advertising to retailer. Use of radio advertising by retailer. Window displays. Inside the store promotions. Direct mail. Sales promotion. Advertising and sales promotion budgets. Advertising plans. Coordination of selling effort.

Laboratory problems based upon actual store promotions.

720-721. **Exporting and Importing.** Three credit hours. Autumn and Winter Quarters. 720 is given in the Autumn Quarter, and 721 in the Winter Quarter. Three class meetings each week. Preferably preceded or accompanied by Business Organization 700, and a course in money and banking. Mr. Held.

Methods of conducting export and import business; foreign trade correspondence and advertising; market analysis; export commission houses and other sales agencies; handling shipments; credits and collections.

725. **Field Work in Marketing.** Three to six credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include Business Organization 700. Mr. Maynard, Mr. Beckman.

This course is open to students temporarily not in residence. The student is required to submit a report covering certain of the marketing problems of the company by which he had been engaged.

* Not given in 1940-1941.

740. Public Utility Organization and Administration. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Economics 618 or 648. Mr. Power.

Public utilities as business enterprises; problems of organization, regulation, and business management in the gas, electric, water, transportation, telephone, telegraph, radio communication, and other utility industries.

***748. Valuation of Railroads and Public Utilities.** Three credit hours. Winter Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include Economics 618 or 648. Mr. Power.

A study of the various methods of the valuation of public utilities and the problems arising therefrom. Study is made of typical valuation and rate cases before state public utilities commissions and before the Interstate Commerce Commission.

***751. Motor Carrier Organization and Administration.** Three credit hours. Winter Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include Economics 618 or 648. Mr. Duffus, Mr. Power.

Highway transportation of persons and property by motor vehicles as a business enterprise; organization and administration of the different types and classifications of motor carriers; current problems confronting their management in their relations with travelers, shippers, competing transportation agencies, and administrative law.

752. Traffic Management. Four credit hours. Winter Quarter. Four class meetings each week. Given in alternate years. General prerequisites must include one of the following: Economics 618, Economics 648, Business Organization 680, or must be taken concurrently. Mr. Duffus.

Traffic management as a factor in business enterprise. Analysis of the business relationships between shippers and carriers with respect to rates and services in the transportation of goods by rail, highway, water, pipe line, and air. Organization of traffic management by shippers and carriers.

760. Personal Insurance. Three credit hours. Winter Quarter. Three class meetings each week. Mr. E. L. Bowers.

Life insurance; accident and health insurance; annuities. Premiums; reserves; investments; surrender values; dividends, etc. Types of policies and companies. Adaptation of insurance to individual cases. Agency organization; state supervision.

761. Casualty Insurance and Surety Bonding. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Ley.

A study, in part, of the following types of insurance and bond coverages: automobile collision; public liability and property damage, including automobile; burglary and robbery; sprinkler leakage and water damage; public officials, court, fiduciary, contract, and depository bonds; title insurance and credit insurance. An examination of the types of insurance and bonding companies and of the extent of governmental supervision and regulation thereof.

764. Fire and Marine Insurance. Three credit hours. Winter Quarter. Three class meetings each week.

Detailed examination of fire, ocean and inland marine insurance contracts. A study of consequential fire coverages including use and occupancy, rent, rental value, and leasehold insurance; inspection and rate making, and adjustment. Types of insurance companies and governmental supervision and regulation thereof.

799. Special Problems in Business Organization. One to three credit hours. One Quarted. Autumn, Winter, Spring. Permission of the instructor is required.

Individual investigations of specific problems in the following fields of Business Organization:

a. Corporation Organization and Finance. Mr. Hoagland and others.
b. Real Estate Problems. Mr. Hoagland and others.
c. Insurance. Mr. E. L. Bowers and others.
d. Marketing. Mr. Maynard and others.
e. Banking. Mr. Dice and others.
f. Industrial Management. Mr. Davis and others.
g. Transportation and Public Utilities. Mr. Duffus, Mr. Power.
h. Radio Advertising. Mr. Dameron.

* Not given in 1940-1941.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

804. Corporation Finance for Graduate Students. Three credit hours. One Quarter. Winter and Spring. Mr. Hoagland, Mr. Duffus.

A conference course for graduate students. The content for any particular Quarter will be adapted to the needs of the students enrolled for that Quarter and will be announced in advance.

816-817-818. Advanced Marketing for Graduate Students. Three credit hours. Autumn, Winter, and Spring Quarters. Three class meetings each week. General prerequisites must include Business Organization 700. Mr. Maynard, Mr. Beckman, Mr. Dameron.

The first two Quarters deal with the evolution of marketing institutions and ideas, early literature in the field, and a critical consideration of fundamental principles of marketing. Special emphasis on the historical and theoretical approach.

The work of the third Quarter is devoted to a consideration of selected marketing problems. Problems chosen will depend upon their contemporary significance and the needs of students enrolled in the course.

820. Problems of Banking and of Stock Prices. One to three credit hours. Spring Quarter. Mr. Dice.

A seminar in the leading problems relating to banking and to stock prices. The desires of the group will determine whether the major part of the course shall be devoted to problems of banking or to problems involved in determining the movements of stock prices.

827. Stock Market for Graduate Students. Three credit hours. Autumn Quarter. Mr. Dice.

A study of the problems involved in judging stock values.

828. Insurance for Graduate Students. Two credit hours. Spring Quarter. Mr. E. L. Bowers.

A conference course for graduate students. The content for any particular Quarter will be adapted to the needs of the students enrolled for that Quarter.

831. Graduate Seminar in Business Organization for Beginning Graduate Students. Two credit hours. Winter Quarter. Mr. Kellogg.

832. Graduate Seminar in Business Organization for Advanced Students. Two credit hours. Autumn, Winter, and Spring Quarters. All instructors.

833. The Theory of Organization and Operation. Three credit hours. Autumn Quarter. General prerequisites must include Business Organization 680. Mr. Davis.

An examination of the following factors as they enter into the problems of planning, organizing and controlling business activities: Business objectives, business ideals, executive leadership, business plans and planning, business policy, functions and functionalization, physical factors of environment. The point of view is that of the administrative executive.

834. The Theory of Organization and Operation. Three credit hours. Winter Quarter. General prerequisites must include Business Organization 680. Mr. Davis.

An examination of the following factors as they enter into the problem of planning, organizing and controlling business activities: Responsibility, authority, accountability, organization structure, line organization, staff organization, completely functionalized relationships, committee organization, organization specifications. The point of view is that of the administrative executive.

845. Transportation and Public Utilities for Graduate Students. Three credit hours. One Quarter. Autumn and Winter. Mr. Duffus, Mr. Power.

A conference course for graduate students. The content for any particular Quarter will be adapted to the needs of the students enrolled for that Quarter and will be announced in advance.

950. Research in Business Organization. Autumn, Winter, and Spring Quarters.

Individual investigations, group discussions participated in by those investigating related subjects. The following fields are suggested:

a. Corporation Organization and Finance. Mr. Hoagland, Mr. Duffus, Mr. Riddle, Mr. Donaldson.
b. Real Estate Problems. Mr. Hoagland.
c. Insurance. Mr. E. L. Bowers, Mr. Ley.
d. Marketing. Mr. Maynard, Mr. Beckman, Mr. Cordell, Mr. Dameron, Mr. Burley, Mr. Nolen.
e. Banking. Mr. Dice, Mr. Willit.
f. Industrial Management. Mr. Davis, Mr. Jucius.
g. Transportation and Public Utilities. Mr. Duffus, Mr. Power.

CERAMIC ENGINEERING
Office, 131 Lord Hall

PROFESSORS WATTS, CARRUTHERS, AND BOLE (RESEARCH), ASSOCIATE PROFESSOR KING

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The following courses do not carry credit for students who received the degree of Bachelor of Ceramic Engineering from The Ohio State University: 600, 601, 603, 605, 610, 615, 620, 705, 706, 707, 708. Courses 701, 702, and 703 may be taken in two different fields and only one of these fields is required for the Bachelor's degree. Graduate students may therefore receive credit for these courses in the fields which did not count towards the Bachelor's degree.

600. Theory of Drying. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include two Quarters of college physics. Mr. Carruthers.

A study of the fundamental physical laws and ceramic technology involved in drying ceramic wares and their application to commercial practice.

601. Driers, Kilns, and Theory of Firing. Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include Ceramic Engineering 600. Mr. Carruthers.

A study of the fundamental principles involved in firing ceramic wares, their application in various ceramic processes and the various types of driers and kilns used in ceramic plants.

603. Elements of Ceramic Plant Engineering. Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include Ceramic Engineering 600. Mr. Carruthers.

A study of the basic processes and equipment used in ceramic manufacturing, including grinding, sizing, filtration, draft, heat transfer, and extrusion.

605. Bodies, Glazes, and Colors. Four credit hours. Spring Quarter. Four lectures each week. General prerequisites must include Ceramic Engineering 615. Mr. Watts.

Ceramic bodies, glazes, and colors.

610. Refractories and Their Uses. Five credit hours. Spring Quarter. Five lectures each week. Mr. King.

Lectures on refractories, their physical and chemical compositions and properties, their utilization and testing.

615. Ceramic Calculations. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include courses in ceramic analysis. Mr. King.

Solution of chemical and physical problems involved in compounding ceramic mixtures, including wet blending. Also instruction in development of series, containing one, two, and three variables.

620. Physical and Chemical Measurements of Clays and Other Ceramic Materials. Five credit hours. Winter Quarter. Two recitations and eight

laboratory hours each week. General prerequisites must include Ceramic Engineering 615 and Chemistry 680. Mr. King.

Application of physical chemical laws to ceramic materials and compounds. Laboratory practice in determination of the essential physical and chemical properties of ceramic mixtures and compounds in the plastic, dry, vitrified, and fused states.

701. Ceramic Investigations. Five credit hours. Autumn Quarter. Conference, library, and laboratory work. General prerequisites must include Ceramic Engineering 605, 615, and 620. Mr. Watts, Mr. King.

Detailed studies and definite problems having practical application in one or more of the following fields of ceramic technology: (a) stoneware; (b) terra cotta; (c) saggers; (d) metal enamels.

702. Ceramic Investigations. Five credit hours. Winter Quarter. Conference, library, and laboratory work. Mr. Watts, Mr. Carruthers.

Detailed studies and definite problems having application in either of the following fields of ceramic technology: (a) earthenware, china, and porcelains; (b) structural clay products.

703. Ceramic Investigations. Five credit hours. Spring Quarter. Conference, library, and laboratory work. Mr. Watts, Mr. King.

Detailed studies and definite problems in practical applications in either of the following fields of ceramic technology: (a) glazes and colors; (b) refractories.

705. Ceramic Designing. Five credit hours. Autumn Quarter. One lecture, one quiz, and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 601 and Mechanics 602. Mr. Carruthers.

Designing of clay plant structures and equipment such as buildings, bins, and retaining walls. Practical problems in structural design and storage of clays.

706. Ceramic Designing. Five credit hours. Winter Quarter. One lecture, one quiz, and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 705. Mr. Carruthers.

A continuation of Ceramic Engineering 705. Study of drying and fan problems and the design of driers.

707. Ceramic Designing. Five credit hours. Spring Quarter. One lecture, one quiz, and eight laboratory hours each week. General prerequisites must include Ceramic Engineering 706. Mr. Carruthers.

A continuation of Ceramic Engineering 706. Study of firing and factory equipment problems and design of kilns and complete clay plants.

708. Technology of Glass. Three credit hours. Autumn Quarter. Two lectures and three laboratory hours each week. General prerequisites must include Ceramic Engineering 615. Mr. Watts.

Practice in melting typical glass batches. Studying physical behavior during the melting process and in the molten state. Measurement of some of the physical properties of the glass produced experimentally and of commercial glasses.

750. Special Problems. Two to seven credit hours. Autumn, Winter, and Spring Quarters. Conference, library, and laboratory work. General prerequisites must include fundamental ceramic engineering courses. Consent of department is required. This course may be repeated for different problems or continuation of original problem, with total credit not to exceed fifteen hours. All instructors.

This course is designed to permit any properly qualified student to avail himself of the library and laboratory facilities of the department for carrying on a special investigation or for adding to his knowledge and technique in some ceramic subject.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites must include satisfactory training in qualitative and quantitative analysis, a knowledge of the general principles of ceramic technology, a knowledge of mathematics through calculus and analytical mechanics, at least a one year's course in physics, with laboratory and problem work, and engineering drawing.

810-811-812. Porcelain for Electrical and Other Special Purposes. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Watts.

815. Seminar in Ceramic Engineering. One to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Watts, Mr. Bole, Mr. Carruthers, Mr. King.

The course consists of conference and reports on problems in ceramic technology and engineering. Topics are chosen to cover the development of the ceramic industry.

950. Research in Ceramic Engineering. Autumn, Winter, and Spring Quarters. Permission of the instructor must be obtained.

Research in ceramic technology and engineering, in analytical and physical chemistry of ceramic materials and mixtures, in mineralogy and geology of ceramic deposits, in physical and chemical testing of ceramic materials and products, under Mr. Watts, Mr. Bole, or Mr. King; in the engineering, designing and testing of ceramic apparatus processes and structures, under Mr. Carruthers; in ceramic whitewares, under Mr. Watts; in refractories and metal enamels under Mr. King. The student may spend a part or all of his time on research work.

CHEMICAL ENGINEERING
Offices, 179, 180 Chemistry Building

PROFESSOR WITHROW, ASSOCIATE PROFESSOR KOFFOLT, ASSISTANT PROFESSOR HERNDON, MR. PENCE, MR. OWENS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The following courses do not carry graduate credit for students who received the degree of Bachelor of Chemical Engineering from The Ohio State University if these courses were used in fulfilling the requirements for that degree: 691, 692, 701, 702, 703, 704, 706, and 707.

Graduate work in the department is designed with the idea of preparing the student for work in the field of chemical engineering, also in the related fields of industrial chemistry and also applied electrochemistry, each of which has a quite different undergraduate and graduate approach requiring flexibility in background and foundation. The regular chemical engineering approach is more rigorous and can be arranged by electives and petitions to include all others and thus meet the highly diversified opportunities of industry without requiring specialized curricula in preparation for chemical and related industry.

691. Elements of Chemical Engineering. Two credit hours. Autumn Quarter. Two lecture-recitation periods each week. Physical chemistry must be included in the general prerequisites or taken concurrently, except with special permission of the instructor. Mr. Koffolt.

A thorough discussion of the engineering operations utilized in the chemical branch of engineering with emphasis on the engineering requirements of the market and economics and of the process and their effect on the engineering used. The work of the course is confined to the fundamental chemical engineering operations as fluid flow, heat transfer, and those operations largely utilized where solids are concerned such as crushing, screening,, etc., and is directed toward a study of the fundamental principles involved, the engineering equipment available and by means of numerous computational problems, the application of science and mathematics.

692. Elements of Chemical Engineering. Two credit hours. Winter Quarter. Two lecture-recitation periods each week. Physical chemistry must be included in the general prerequisites or taken concurrently, except with special permission of the instructor. Mr. Pence.

A continuation of the study of engineering operations constituting the body of Chemical Engineering concerned with those operations largely utilized where liquids and gases are concerned, such as evaporation, distillation, drying, liquefaction, absorption, etc. Examples of special design requirements for processes such as carbonization, nitration, sulfonation, etc., as well as catalytic processes are studied with respect to the principles involved and the engineering equipment developed to carry out these processes. Emphasis is placed upon the concept of separations, such as the engineering requirement of the separation of solids from solids, from liquids, from gases, liquids from solids, from liquids, etc.

†694. Chemical Engineering Operations Laboratory. Eight credit hours. General prerequisites must include Chemical Engineering 691 and 692. Mr. Koffolt, Mr. Withrow, Mr. Herndon, Mr. Machwart.

The fundamental laboratory course in chemical engineering. Laboratory study and investigation of the operating characteristics and efficiency of equipment utilized in carrying out the more important chemical engineering operations, such as fluid flow, heat transfer, distillation, etc. Stress is laid upon the practical utilization of calculus, physics, physical chemistry, and thermodynamics, and the construction and use of graphical charts and representations, such as nomographs, graphical calculus, etc.

† Not given during the academic year, 1940-1941.

701-702. Industrial Chemistry. Three credit hours. Autumn and Winter Quarters. Three lectures each week. Physical chemistry must be included in the general prerequisites or taken concurrently, except with special permission of the instructor. Mr. Withrow, Mr. Pence.

The fundamental lecture course in industrial chemistry, dealing with the problems of the chemical industries, and stressing comprehensive and detailed computational treatment involving the applications of the fundamentals of economics, mathematics, physics, chemistry, chemical engineering, etc., to the solution of problems involving integration in part or in detail of sequences of chemical and engineering operations which make up processes. The work of the Autumn Quarter deals especially with the inorganic industries, while that of the Winter Quarter is related to the organic industries.

703. Inspection Trip to the West. No credit hours. One week between the Winter and Spring Quarters, 1941, and odd-numbered years thereafter. In addition to the general prerequisites, permission of the instructor is required. Mr. Withrow, Mr. Koffolt, Mr. Herndon, Mr. Pence.

The trip includes Rittman, Akron, and Cleveland, Ohio; Niagara Falls, Rochester, and New York, New York; Grasselli and Deep Water Point, New Jersey, Wilmington, Baltimore, and Curtis Bay, Maryland; and Washington, D. C. The entire expense need not exceed $70.00. A satisfactory written report upon the work of the trip and an examination are required.

***704. Inspection Trip to the West.** No credit hours. One week between the Winter and Spring Quarters, 1942, and even-numbered years thereafter. In addition to the general prerequisites, permission of the instructor is required. Mr. Withrow, Mr. Koffolt, Mr. Herndon, Mr. Pence.

The trip includes Dayton, West Carrollton, Hamilton, Cincinnati, and Ivorydale, Ohio; Kensington, Illinois; Grasselli and Whiting, Indiana; Chicago and Argo, Illinois; Detroit, Wyandotte, and Midland, Michigan. The entire expense need not exceed $55.00. A satisfactory written report upon the work of the trip and an examination are required.

705. Written Reports. No credit hours. One week between the Winter and Spring Quarters in the University Library. General prerequisites must include Chemical Engineering 701-702. Mr. Herndon.

A substitute course for Chemical Engineering 703 or 704, allowed only upon presentation of reasons satisfactory to the instructor in charge. The course consists of assigned reading designed to familiarize the student with all that can be found in the literature or plants regarding chemical engineering, and specified industrial chemical processes, together with a full written report.

706. Chemical Engineering and Industrial Chemistry Laboratory. Two to five credit hours. Autumn Quarter. One hour conference and five to fourteen laboratory hours each week. General prerequisites must include an acceptable course in analytical chemistry. Chemical Engineering 701 must also be included in these general prerequisites or taken concurrently. Mr. Withrow, Mr. Herndon, Mr. Koffolt, Mr. Pence, Mr. Owens, Mr. Row.

An introduction to industrial chemical research through assigned manufacturing problems, beginning with the preliminary analysis of an inorganic, and organic production problem, progressing through the logical steps of laboratory development to the final culmination of the investigation—the design and layout of equipment of the plant to make the given chemical product. Emphasis is placed on the correlation and integration of the fundamental courses in chemistry, mathematics, chemical engineering operations, engineering drawing, etc. The specific problems are so chosen as to disclose the fundamental principles underlying the assigned industry. Weekly inspection trips are taken to plants in and around Columbus for study and report upon equipment and operation. Great emphasis is laid upon methods of attacking problems and upon organization of written and oral reports. Certain types of problems with engineering equipment and in factory research are required of all students, after which opportunity is given the student to select special problems in various portions of the fields of chemical engineering such as absorption systems, filtration, etc., and in industrial chemistry such as petroleum, sugar technology, intermediates, wood distillation, insecticides, starch, lime, chlorine, and plant fume questions.

707. Engineering Chemistry and Chemical Engineering Laboratory. Three credit hours. Winter Quarter. One conference and eight laboratory hours each week. General prerequisites must include Chemical Engineering 706. Chemical Engineering 702 must be taken concurrently. Mr. Herndon, Mr. Withrow, Mr. Owens, Mr. Pence.

A continuation of Chemical Engineering 706. Special emphasis is laid upon technical meth-

* Not given in 1940-1941.

ods of control as applied to industrial chemical processes and upon control of technical products according to standard American Society for Testing Materials methods and with standard equipment.

708. Practical Experience in Chemical Engineering Work. Six credit hours. General prerequisites must include Chemical Engineering 691-692. Mr. Withrow.

Academic credit for this course is based on the reports of a student who has had practical experience of a chemical engineering character in a semi-responsible position covering a more advanced grade of work than that required in Chemical Engineering 501.

The student shall present a satisfactory report, the outline and basis of which, it is preferred, shall be arranged in conference prior to beginning the work. In general the report shall cover in very considerable detail, the particular industry with which the student is connected, in respect to market demand and economics, chemistry involved, engineering operations, plant layout, special equipment and design, operation methods, costs and efficiencies (in so far as this information is obtainable), labor problems, and safety and health hazards, together with other pertinent matter. Flow sheets, production schedules, sketches and photographs to illustrate the report, are especially to be desired.

The student also who has had twelve months' or more experience in industry may present a report which, if satisfactory, will be accepted in lieu of the above requirements.

710. Applied Electrochemistry. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Chemistry 681-682-683 or special permission of the instructor must be obtained. Mr. Pence, Mr. Owens.

A survey of the electrochemical industries and a discussion of the principles underlying the application of the electric current in chemical industries. Quantitative relationships and application of thermodynamics are stressed, requiring the solution of numerous problems.

712-713-714. Advanced Chemical Engineering Machinery Laboratory. Two to six credit hours. Autumn, Winter, and Spring Quarters. One conference and five to seventeen laboratory hours each week. General prerequisites must include Chemical Engineering 706-707 or special permission of the chairman of the department must be obtained. Mr. Koffolt, Mr. Withrow, Mr. Pence, Mr. Owens.

An advanced course of minor problems dealing with various chemical engineering equipment with the view of acquainting students with all types of equipment, their design, and operation. The application of thermodynamics and graphics to chemical engineering problems.

The conferences cover topics chosen from the field of chemical engineering. Specific topics are given each Quarter.

Students may repeat these courses with credit, with the approval of the chairman of the department, inasmuch as the topics vary from year to year. The following is a list of topics from which work in this course is chosen: Graphical Chemical Engineering Computations, Drying, Humidification, Dehumidification, Adsorption, Absorption, Fume and Smoke, Crystallization, Filtration, Crushing and Grinding, Furnace and Pyrometry, Evaporation, Refrigeration, Distillation, Cracking, Heat Transfer, and Flow of Fluids.

723. Special Project Problem Investigations. Five or six credit hours. One Quarter. Autumn, Winter, Spring. Conferences and laboratory work. General prerequisites must include Chemical Engineering 722, except by special permission. Mr. Withrow, Mr. Koffolt, Mr. Herndon, Mr. Pence, Mr. Owens.

Individual laboratory work on some problem chosen to develop power of independent investigation.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites must include courses in qualitative and quantitative analysis, and an introductory course in organic chemistry and physics. Preparation in mathematics through calculus with some engineering drawing and mineralogy, although not always required or concurrent is desirable.

801. Introductory Problems in Chemical Engineering. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. Conference, library and laboratory work. General prerequisites must include satisfactory courses in the field of the problem undertaken. The course may be repeated on other problems as desired. Mr. Koffolt, Mr. Herndon, Mr. Withrow, Mr. Pence, Mr. Owens.

The work of the course is carried on by individual conference, library, and laboratory work and consists of problems involving an introduction to the application of physics, mathe-

matics, drawing, mechanics, and chemistry in the field of chemical engineering. This course is largely practical examinations by assigned problems covering widely all the fundamentals underlying chemical engineering.

900-901-902. Advanced Industrial Chemistry and Chemical Engineering. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. One hour conference and five to fourteen laboratory hours each week. General prerequisites must include acceptable courses in industrial chemistry, or the permission of the instructor must be obtained. Mr. Koffolt, Mr. Herndon, Mr. Withrow, Mr. Pence, Mr. Owens.

An advanced course dealing with the solution of minor problems in industrial chemistry and chemical engineering. Special work will be planned along lines in industrial chemistry or chemical engineering as may be desired by the individual student.

905-906-907. Seminar in Industrial Chemistry and Chemical Engineering. Two credit hours. Autumn, Winter, and Spring Quarters. Two conference hours each week. General prerequisites must include satisfactory courses in industrial chemistry. Mr. Withrow, Mr. Koffolt, Mr. Herndon.

The course consists of conferences and reports upon methods of attacking special problems in industrial chemistry and chemical engineering. The topics vary from Quarter to Quarter, keeping in touch with the constant development of chemical industry.

950. Research in Industrial Chemistry and Chemical Engineering. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include satisfactory courses in the chosen field of research. Mr. Withrow, Mr. Koffolt, Mr. Herndon, Mr. Pence, Mr. Owens.

Advanced research problems and dissertation in any one of the following fields depending upon undergraduate approach:

a. Chemical Engineering
b. Industrial Chemistry
c. Applied Electrochemistry

CHEMISTRY

Office, 115 Chemistry Building
General Chemistry Office, 112 Chemistry Building

PROFESSORS EVANS, McPHERSON (EMERITUS), HENDERSON, FOULK (EMERITUS), BOORD, FRANCE, JOHNSTON, MOYER, AND BRODE, ASSOCIATE PROFESSORS FERNELIUS, WOLFROM, QUILL, AND HENNE, NON-RESIDENT ASSOCIATE PROFESSOR ROTHEMUND (KETTERING FOUNDATION, ANTIOCH COLLEGE), ASSISTANT PROFESSORS HOLLINGSWORTH, GARRETT, HARRIS, MacNEVIN, VERHOEK, AND WIRTH, MR. LASSETTRE, MR. MacWOOD, MR. METCALF, MR. NEWMAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Prerequisite for Graduate Work: The student must have had approximately 50 Quarter hours (33 semester hours) of undergraduate work in chemistry. This requirement must include general inorganic chemistry, qualitative and quantitative analysis, introductory courses in organic and physical chemistry, including laboratory work in all subjects.

621. Advanced Quantitative Analysis. Three to five credit hours. Autumn Quarter. One conference and six to twelve laboratory hours each week. Mr. Moyer.

An extension of the first year's work in quantitative analysis, including electrometric titrations, colorimetric and turbidimetric analysis, and hydrogen ion determinations.

622. General Quantitative Analysis. Three credit hours. Winter Quarter. Three lectures or recitations each week. Mr. Moyer, Mr. MacNevin, Mr. Wirth.

General principles of chemical analysis.

***624. Advanced Qualitative Analysis.** Five credit hours. Spring Quarter. Two recitations and nine laboratory hours each week. Permission of the instructor in charge. Mr. MacNevin.

This course emphasizes the application of physico-chemical principles to the problems of qualitative analysis. Micro- and semi-micro techniques are commonly used in the laboratory.

* Not given in 1940-1941.

625. Water Analysis. Five credit hours. Spring Quarter. Three lectures and six laboratory hours each week. Mr. Wirth.

Methods of sanitary and industrial water analysis, and interpretation of the analytical results.

†626. Quantitative Microchemical Analysis. Five credit hours. Winter Quarter. One lecture and twelve laboratory hours each week. Limited enrollment. Registration only by permission of the instructor. Mr. MacNevin.

For advanced students in chemistry and closely related fields.

628. Spectroscopic Analysis. Three to five credit hours. Winter Quarter. One lecture and two to four laboratory hours each week. Mr. Brode.

General principles of spectroscopic qualitative identification and quantitative estimation of the elements. Spectrophotometry of organic and inorganic compounds. Special applications to metallurgy, plant and biochemical analysis, identification of dyes and organic compounds.

641. Qualitative Organic Analysis. Four credit hours. Spring Quarter One lecture and nine laboratory hours each week. Mr. Brode.

A study of the systematic methods of separation, purification, and identification of organic compounds.

642. Quantitative Semi-microorganic Analysis. Four credit hours. Winter Quarter. One lecture and three three-hour laboratory periods each week. Mr. MacNevin.

The common determinations used in the identification of organic compounds will be studied. Semi-micro methods will be used.

645-646. Organic Chemistry. Three credit hours. Winter and Spring Quarters. Three lectures or recitations each week. General prerequisites must include acceptable courses in general and analytical chemistry. Mr. Brode.

The fundamental course in organic chemistry. Chemistry 645 is devoted to a discussion of the aliphatic hydrocarbons and their derivatives and Chemistry 646 to a discussion of the coal tar compounds.

Not open to students who have credit for Chemistry 451-452. Not available for graduate credit for students majoring in chemistry.

647-648. Organic Chemistry. Three credit hours. Autumn and Winter Quarters. Three lectures or recitations each week. General prerequisites must include acceptable courses in general and analytical chemistry. Mr. Boord.

The fundamental course in organic chemistry. Chemistry 647 is devoted to a discussion of the aliphatic hydrocarbons and their derivatives and Chemistry 648 to a discussion of the coal tar compounds.

Not open to students who have credit for Chemistry 451-452. Not available for graduate credit for students majoring in chemistry.

649-650. Organic Chemistry: Laboratory. Three credit hours. Two Quarters. 649, Autumn and Winter; 650, Winter and Spring. Nine laboratory hours each week. Chemistry 645-646 or 647-648 must be included in the general prerequisites or taken concurrently. Mr. Brode, Mr. Boord.

The laboratory work naturally belonging to Chemistry 645-646 or 647-648. The preparation of a series of typical organic compounds, their purification, and a study of their properties.

Chemistry 649 is not open to students who have credit for Chemistry 451-452. Not available for graduate credit for students majoring in chemistry.

***654. X-rays and Crystal Structure.** Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Given in alternate years. Mr. Harris, Mr. Blake, Mr. McCaughey.

This course is designed for those students of physics, chemistry, and mineralogy who intend to do research work in crystal structures and X-ray analysis.

This course is the same as Mineralogy 654 and Physics 654.

661. Advanced Inorganic Chemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. Mr. Fernelius.

An advanced course in inorganic chemistry with emphasis upon the binary inorganic compounds, their preparation, classifications, reactions, and pertinent theory.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

662. Advanced Inorganic Chemistry. Three credit hours. Winter Quarter. Three lectures or recitations each week. Mr. Fernelius.

An advanced course in inorganic chemistry with emphasis upon the ternary and complex inorganic compounds, their preparation, classifications, reactions, and pertinent theory.

663. The Rare Elements. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Chemistry 661 or equivalent. Mr. Fernelius.

Lectures on the chemistry of the less familiar elements, emphasizing their relations to the well-known elements, as well as their technical applications.

***668. Non-aqueous Solvents.** Three credit hours. Spring Quarter. Three lectures or recitations each week. Given in alternate years. Mr. Fernelius.

A consideration of the solvent properties of various solvents, electrical conductance of non-aqueous solutions, the nature of acidity, systems of compounds and evidence obtained from studies of liquid ammonia solutions of metals and inter-metallic compounds, which contributes to an understanding of the nature of the metallic state.

672. Inorganic Chemistry: Laboratory. Three credit hours. Spring Quarter. Nine laboratory hours each week. Mr. Fernelius.

a. **Inorganic Preparations.** Methods employed in the preparation of pure inorganic compounds. The chief classes of such compounds. The laboratory preparation of a number of examples sufficient to develop reasonable technique in applying the methods and to illustrate the classes.

b. **Rare Elements.** Laboratory work illustrative of the chemistry of the less familiar elements. The preparation of pure compounds of the rare elements using in many cases ores or industrial concentrates as starting materials.

c. **Advanced Techniques.** The use of some of the newer and more difficult techniques in the field of inorganic syntheses. These techniques include the use of liquefied gases, low and high temperature apparatus, high pressure and high vacua apparatus, etc.

675. The Phase Rule. Two credit hours. Spring Quarter. Two meetings each week. Given in alternate years. Mr. Fernelius.

A study of the phase rule and its applications in chemical research.

680. Physical Chemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. In addition to the general prerequisites acceptable courses in physics and calculus. Mr. France.

An introductory course in physical chemistry, adapted to the needs of students of ceramics.

681. Physical Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. Acceptable courses in physics and two Quarters of calculus must be included in the general prerequisites or taken concurrently. It is recommended that Chemistry 691 be taken concurrently. Mr. Johnston.

The fundamental course in chemical principles.

682. Physical Chemistry. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Chemistry 681. It is recommended that Chemistry 693 be taken concurrently. Mr. Johnston.

A continuation of Chemistry 681.

683. Physical Chemistry. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Chemistry 682. It is recommended that Chemistry 693 be taken concurrently. Mr. Johnston.

A continuation of Chemistry 682.

691-692-693. Physical Chemistry: Laboratory. Two credit hours. Autumn, Winter, and Spring Quarters. Six laboratory hours each week. An acceptable course in physical chemistry must be included in the general prerequisites or taken concurrently. These courses are designed to accompany Chemistry 681, 682, and 683, respectively. Mr. France, Mr. Johnston, Mr. Harris.

Quantitative measurements of phenomena of chemical interest and the application of chemical principles to their interpretation. The measurements include experiments in the determination of molecular weights and chemical constitution, thermochemistry, reaction rates, equilibria, electrochemistry, colloid chemistry, high vacuum, and glass blowing techniques, etc.

* Not given in 1940-1941.

695. Colloid Chemistry. Three credit hours. Winter Quarter. Three lectures or recitations each week. In addition to the general prerequisites, acceptable courses in physics. Mr. France.

A fundamental course in colloid chemistry.

696. Theoretical Electrochemistry. Three credit hours. Autumn Quarter. Three lectures or recitations each week. Mr. France.

A fundamental course in theoretical electrochemistry.

701. Minor Problems in Chemistry. One to fifteen credit hours. Any Quarter. Conference, library, and laboratory work. General prerequisites must include satisfactory courses in the field of the problem undertaken. A student may repeat this course and may spend all or any part of his time on it during a Quarter.

This course is designed to permit any properly qualified person to avail himself of the library and laboratory facilities of the department for carrying out a minor investigation or for adding to his knowledge and technique in some chemical subject.

A student may exercise entire freedom in his choice of instructor to conduct his work in this course, but as a rule, topics in organic chemistry will be under the direction of Mr. Evans, Mr. Boord, Mr. Brode, Mr. Wolfrom, Mr. Henne, Mr. Rothemund, Mr. Newman; in inorganic chemistry, under Mr. Henderson, Mr. Fernelius, Mr. Quill; in physical chemistry, under Mr. France, Mr. Johnston, Mr. Fernelius, Mr. Harris, Mr. Garrett, Mr. Verhoek, Mr. Lassettre, Mr. MacWood; in analytical chemistry, under Mr. Hollingsworth, Mr. Moyer, Mr. Brode, Mr. MacNevin, Mr. Wirth; and in colloid chemistry and electrochemistry, under Mr. France.

782. Chemical Bibliography. One credit hour. Autumn Quarter. One conference each week. General prerequisites must include acceptable courses in analytical and organic chemistry. Mr. Fernelius.

Designed to train the advanced student in the use of the chemical library, and to instruct him in the character of various chemical journals, dictionaries, reference books, and other sources of information pertaining to chemical subjects.

783. Chemical Biography. One credit hour. Winter Quarter. One lecture each week. General prerequisites must include acceptable courses in analytical and organic chemistry. Mr. Fernelius.

Designed to familiarize the advanced student with the leading personages in chemistry, particularly those of recent and contemporary times, as well as with the available sources of information relating to such personages.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 684.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include a thorough preparation in general inorganic chemistry, qualitative and quantitative analysis and introductory courses in organic chemistry and in physical chemistry (including laboratory courses in both subjects), acceptable courses in physics and mathematics, including calculus.

Requirements for the Master's Degree: (a) The course requirements for the Master's degree are not rigidly fixed, but the program of work should lead to an adequate and well-rounded foundation for advanced work. These courses should be supplemented by others selected from the candidate's field of specialization and in conference with his adviser. (b) The candidate must give evidence of his ability to read chemical papers in either French or German. (c) About two weeks prior to the date proposed for conferring the degree the candidate must pass a written examination. Should the graduate record of the candidate be wholly satisfactory, the scope of the examination would be confined to the candidate's field of specialization.

Requirements for the Degree of Doctor of Philosophy: (a) The candidate should arrange his first year's courses in a way that will broaden his knowledge of the four general provinces of Chemistry. (b) He should acquire such broad familiarity with his special field of concentration in Chemistry as may reasonably be expected from courses and seminars available, from laboratory experience and from habitual use of the chemical library (especially current literature); he should be reasonably familiar with the use of the chemical library, with the work of eminent chemical personages, and with the outline of the historical development of chemical science; and he must possess a reading knowledge (in chemical literature) of both French and German. (c) A Divisional Examination will be held in the Spring Quarter. This should be taken normally at the end of the candidate's first year of graduate work. This examination will be written and will cover the following four divisions of the science; analytical, inorganic, organic, and physical. (d) For admission to candidacy, the candidate must take an examination in the

Autumn Quarter, and at the time that corresponds as nearly as possible to the beginning of his third year of graduate progress. This examination will be written and oral, and will be limited to the candidate's division of specialization in chemistry.

822. Seminar in Analytical Chemistry. Three credit hours. Winter Quarter. Three conferences each week. Mr. Wirth.

Topic for 1940-1941: Optical Methods of Analytical Chemistry.

823. Seminar in Analytical Chemistry. Two credit hours. Spring Quarter. Two conferences each week. Mr. Moyer.

Topic for 1940-1941: Organic Analytical Reagents.

824. Seminar in Analytical Chemistry. Two credit hours. Autumn Quarter. Two conferences each week. Mr. MacNevin.

Topic for 1940-1941: Polarographic Measurements.

830. Historical Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Fernelius.

A general course in the history of chemistry with special reference to the development of the theories of the science.

841. Advanced Organic Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Boord.

An advanced course in the fundamental principles of organic chemistry, covering the chain hydrocarbons and their derivatives.

842. Advanced Organic Chemistry. Three credit hours. Winter Quarter. Three lectures each week. Mr. Wolfrom.

A continuation of Chemistry 841, covering the carbocyclic compounds, including aromatic, hydroaromatic, and terpene derivatives.

843. Advanced Organic Chemistry. Three credit hours. Spring Quarter. Three lectures each week. Mr. Brode.

A continuation of Chemistry 841 and 842 covering the heterocyclic compounds with special emphasis upon nitrogen derivatives.

844-845. Advanced Organic Chemistry: Laboratory. Three credit hours. Autumn and Winter Quarters. Nine hours of library, conference, and laboratory work each week. Chemistry 841 and 842 must be included in the general prerequisites or taken concurrently. Mr. Boord, Mr. Brode, Mr. Wolfrom, Mr. Evans, Mr. Henne, Mr. Newman.

An advanced course in the synthesis of aliphatic (Autumn) and aromatic (Winter) compounds and a study of their chemical characteristics. Selection may be made from the following topics to supplement the student's previous training and to develop his laboratory technique:

I. Synthetic Preparations, involving the use of the standard procedures for alkylation, esterification, condensation, ring closure, oxidation, reduction and nuclear substitution. Particular emphasis will be placed upon the yields and purity of products.

II. Special Methods and Techniques.

a. Catalytic hydrogenation.
b. Electro-chemical preparations.
c. Resolution of optically active compounds.
d. Preparation of research intermediates.

These courses lead directly to minor research problems in the field of organic chemistry.

847. Theoretical Organic Chemistry. Three credit hours. Autumn Quarter. Three lectures or discussions each week. General prerequisites must include one year of graduate work in chemistry including Chemistry 841 and 842 or their equivalent. Mr. Wolfrom.

A discussion of the structural theory of organic chemistry, tetravalent carbon, homology, chemical and physical isomerism and stereochemistry.

848. Theoretical Organic Chemistry. Three credit hours. Winter Quarter. Three lectures or discussions each week. General prerequisites must include one year of graduate work in chemistry including Chemistry 841 and 842 or their equivalent. Mr. Wolfrom.

A discussion of molecular rearrangements, isomerization and polymerization including the theories which have been evolved for their explanation.

849. Theoretical Organic Chemistry. Three credit hours. Spring Quarter. Three lectures or discussions each week. General prerequisites must in-

clude one year of graduate work in chemistry including Chemistry 841 and 842 or their equivalent. Mr. Boord.

A discussion of the nature and types of organic reactions, including theories and reaction mechanism.

850. Seminar in Organic Chemistry. Three credit hours. Autumn Quarter. Three conference hours each week. General prerequisites must include Chemistry 841 and 842. Mr. Brode.

Topic for 1940-1941: Synthetic Medicinals.

851. Seminar in Organic Chemistry. Three credit hours. Winter Quarter. Three conference hours each week. General prerequisites must include Chemistry 841 and 842. Mr. Boord.

Topic for 1940-1941: Aliphatic Hydrocarbons.

852. Seminar in Organic Chemistry. Three credit hours. Spring Quarter. Three conference hours each week. General prerequisites must include Chemistry 841 and 842. Mr. Evans.

Topic for 1940-1941: The Chemistry of the Saccharides.

†854. Seminar in Organic Chemistry. Three credit hours.

Open to auditors and advanced students not working for credit.

861. Physical Chemistry: Laboratory. Two or three credit hours. One Quarter. Autumn, Winter, Spring. Nine laboratory hours each week. Mr. France, Mr. Johnston, Mr. Harris, and assistants.

An advanced course in physico-chemical experimental work designed to illustrate the more important principles of physical chemistry, to develop skill in this type of laboratory work and to form a basis for research.

866. Seminar in Inorganic Chemistry. Two credit hours. Autumn Quarter. Two conferences each week. Mr. Quill.

Topic for 1940-1941: Recent Advances in the Chemistry of the Metals.

867. Seminar in Inorganic Chemistry. Two credit hours. Winter Quarter. Two conferences each week. Mr. Fernelius.

Topic for 1940-1941: Recent Advances in the Chemistry of the Non-Metals.

881-882-883. Lectures in Advanced Physical Chemistry. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Chemistry 681-682-683. Given in alternate years in lieu of Chemistry 887-888-889. Mr. Harris.

A number of topics of special interest to physical chemists at the present time will be treated, such as special topics from the field of kinetics of chemical reactions, kinetics of adsorption and of evaporation from liquid and solid surfaces, dielectric constants, wave-mechanical theory of chemical bonds, photochemistry, etc.

*884. Quantum Theory and Spectra in the Field of Chemistry. Three credit hours. Autumn Quarter. General prerequisites must include Chemistry 681-682-683. Mr. Johnston.

The early part of the course consists of an historical presentation of the field of subatomic phenomena and of nuclear and radiation theories. Atomic structure is taken up from the quantum standpoint with particular emphasis on line and X-ray spectra, energy level diagrams, ionization and resonance potentials and the conventional designation of atomic quantum levels. Particular chemical applications which are discussed include the quantum description of the Periodic Table of the Elements, valence, paramagnetism, the magneto-caloric effect, activation and de-activation processes, the average life in activated states, metastable states and the primary photochemical phenomena. Emphasis is placed, throughout the course, on the experimental approach to the various topics and on preparation for the chemical utilization of spectroscopic data.

Not open to students who have credit for Chemistry 865.

*885. Quantum Theory and Spectra in the Field of Chemistry. Three credit hours. Winter Quarter. General prerequisites must include Chemistry 647-648 and 681-682-683. Mr. Johnston.

A continuation of Chemistry 884. Molecular structure is taken up from the quantum standpoint with particular emphasis on band spectra, the correlation of atomic and molecular elec-

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

tronic states, energy level diagrams worked out for some typical molecules, potential energy curves, optical dissociation, predissociation, fluorescence and Raman spectra, infra-red absorption, continuous absorption, isotope effects, ortho and para molecular states, the determination of bond distances and bond angles, quantum mechanical resonance, the strengths of linkages in organic molecules, and applications to chemical thermo-dynamics and photo-kinetics.

*887-*888-*889. Lectures in Advanced Physical Chemistry. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Chemistry 681-682-683. Given in alternate years in lieu of Chemistry 881-882-883. Mr. Johnston.

Training in the use of thermodynamics as a tool for solving chemical problems. Topics to be discussed include: vapor pressure; solutions and solubility; molecular spectra; free energy; modern theories of electrolytic dissociation; galvanic cells; and the various factors associated with the measurement and control of chemical equilibria.

890. Seminar in Physical Chemistry. Three credit hours. Autumn Quarter. Three conferences each week. Mr. Harris.

Topic for 1940-1941: To be announced.

891. Seminar in Colloid Chemistry and Electrochemistry. Three credit hours. Winter Quarter. Three conferences each week. Mr. France.

Topic for 1940-1941: Adsorption and Crystal Habit Modification.

892. Seminar in Physical Chemistry. Three credit hours. Spring Quarter. Three conferences each week. General prerequisites must include Chemistry 681-682-683. Mr. Johnston.

Topic for 1940-1941: To be announced.

950. Research in Chemistry. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work.

Research work in organic chemistry is conducted under the supervision of Mr. Evans, Mr. Boord, Mr. Brode, Mr. Wolfrom, Mr. Henne, Mr. Rothemund, Mr. Newman; in inorganic chemistry under Mr. Henderson, Mr. France, Mr. Fernelius, Mr. Quill; in physical chemistry under Mr. France, Mr. Johnston, Mr. Fernelius, Mr. Harris, Mr. Garrett, Mr. Verhoek, Mr. Lassettre, Mr. MacWood; in analytical chemistry under Mr. Wirth, Mr. Hollingsworth, Mr. Moyer, Mr. Brode, Mr. MacNevin; and in colloid chemistry and electrochemistry, under Mr. France.

NOTE: Attention is called to the fact that courses in physiological chemistry are listed elsewhere in this Bulletin under the Department of Physiological Chemistry and Pharmacology.

NOTE: For Industrial Chemistry, Applied Electrochemistry, and Chemical Engineering Courses see the Department of Chemical Engineering.

CIVIL ENGINEERING
Office, 107 Brown Hall

PROFESSORS MORRIS, †SHERMAN (EMERITUS), CODDINGTON, SLOANE, SHANK, AND PRIOR, ASSOCIATE PROFESSORS MONTZ, WALL, AND LARGE, ASSISTANT PROFESSOR MARSHALL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

602. Sanitary Engineering. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in city surveying and summer surveying camp. Mr. Prior..

Lectures and recitations upon sewerage systems, sewage, and sewage treatment.

608. Precise Surveying. Three credit hours. Autumn Quarter. One recitation and two laboratory periods each week. General prerequisites must include calculus, railroad surveying, and summer surveying camp. Mr. Coddington, Mr. Marshall.

Primary traverse, base line measurements, field triangulation, precise leveling.

* Not given in 1940-1941.

† Died, May 6, 1940.

609. Adjustment of Observations. Three credit hours. Winter Quarter. Three two-hour laboratory periods each week. General prerequisites must include Civil Engineering 608. Mr. Coddington, Mr. Marshall.

Theory of adjustment of observations, using work of preceding term; precise maps.

610. Masonry Materials. Five credit hours. Winter Quarter. Three recitations and two laboratory periods each week. Mechanics 602 must be included in the general prerequisites or taken concurrently. Mr. Large, Mr. Wall.

Recitations and laboratory work in concrete and other masonry materials; foundations.

612. Earth Engineering. Three credit hours. Spring Quarter. Two three-hour laboratory periods each week. General prerequisites must include Civil Engineering 610 and Mechanics 602. Mr. Prior, Mr. Large, Mr. Tucker.

Investigation and analysis of earths for engineering structures.

701. Concrete Design. Five credit hours. Autumn Quarter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include Civil Engineering 610 or a course in cement and concrete and Mechanics 602. Mr. Shank, Mr. Large.

Theory and design of reinforced concrete structures.

702. Bridge Design. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in stresses in structures and Mechanics 602. Mr. Morris.

A course in design of steel roofs and bridges.

703. Water Supply Engineering. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include Mechanics 605 and 610. Mr. Prior.

Construction and operation of public water supplies.

705. Masonry Structures. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include Civil Engineering 612 and 701. Mr. Prior.

Application of principles of civil engineering to various masonry structures.

709. Geodetic Engineering. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Civil Engineering 608 and 609. Mr. Coddington, Mr. Marshall.

Trigonometric reconnaissance, use of geographic coordinates, and problems involving figure of the earth.

711. Elementary Structural Engineering. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanics 602. Mr. Shank.

Theory and design of steel and reinforced concrete beams, columns and trusses.

712. Trusses. Five credit hours. One Quarter. Autumn and Winter. Five recitations each week. General prerequisites must include Mechanics 602. Mr. Shank, Mr. Large.

Stresses in and design of steel-frame mill buildings.

713. Concrete Design. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include Mechanics 602. Mr. Large.

A course for architectural engineers, similar to Civil Engineering 701.

715. Timber Construction. Five credit hours. Winter Quarter. Three recitations and two laboratory periods each week. General prerequisites must include Mechanics 601 and 602. Mr. Sloane, Mr. Montz.

Lectures on wood and its application to design of engineering structures.

730. Transportation Engineering. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Civil Engineering 604 and 605. Mr. Montz.

Engineering economics illustrated by rail, road, and water transportation.

732. Contracts and Specifications. Three credit hours. Spring Quarter. Three recitations each week. Mr. Prior.

Professional practice and principles underlying engineering contracts and specifications.

733. Tall Buildings. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Civil Engineering 712 or a course in stresses in structures. Mr. Large.

Stresses in and design of steel-frame office buildings.

734. Advanced Bridges. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Civil Engineering 702. Mr. Morris.

Stresses in and design of arch bridges.

738. Highway Plans and Surveys. Three credit hours. Autumn Quarter. One recitation and two three-hour laboratory periods each week. General prerequisites must include courses in topographic surveying and roads and pavements. Mr. Sloane.

Reconnoissance and location surveys, alignment and grades, curve widening and superelevation, bridge and culvert surveys, preparation of plans and estimates, study of highway standards.

739. Bituminous Roads and Surfaces. Three credit hours. Winter Quarter. One recitation and two three-hour laboratory periods each week. General prerequisites must include a course in roads and pavements. Mr. Sloane.

Study of various types of bituminous roads now in use, plant layout and construction details, analysis of specifications and study of current literature on maintenance, renewals and surface treatments, laboratory tests of asphalts, tars, and oils.

799. Advanced Civil Engineering. Three to five credit hours. One Quarter. Autumn, Winter, Spring. In addition to the general prerequisites, permission of the chairman of the department. All instructors.

This course is intended to give the advanced student opportunity to pursue advanced study Work undertaken may be elected in the field of highways, structures, sanitary engineering, water supply, geodetic engineering, transportation, and other special fields in civil engineering.

A student may repeat this course until he has obtained a maximum of twenty credit hours. He may accumulate not more than ten credit hours in any one of the above subdivisions.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Civil Engineering. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. All instructors.

CLASSICAL LANGUAGES AND LITERATURE

Office, 217 Derby Hall

PROFESSORS TITCHENER, HODGMAN (EMERITUS), AND BOLLING, ASSISTANT PROFESSORS HOUGH AND ABBOTT

(See page 50 for the program in Ancient History and Literature.)

GREEK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Reading and Lectures. Three to five credit hours. One Quarter. Winter and Spring. Three to five meetings each week. General prerequisites should include a course in Homer, unless permission of instructor is obtained. Mr. Bolling, Mr. Hough.

Study of the language, style, and works of some author or group of authors, chosen to meet the particular needs of the class. The course may consequently be repeated.

610. Private Reading and Minor Problems. Two to five credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites should include a course in elementary Greek. Mr. Bolling, Mr. Hough.

Passages for private reading and topics for investigation will be suggested to meet the needs of individual students.

660. Greek Literature in Translation. Three credit hours. Autumn Quarter. Three lectures each week. No prerequisite. Mr. Titchener.

A study of the history and development of Greek Literature, particularly the epic and drama, in English translation.

701. Principles of the Historical Study of Language. Three credit hours. Spring Quarter. Three lectures each week. Mr. Bolling.

The elements of linguistic science together with an outline of the Indo-European family of languages.

720-721-722. Historical Greek and Latin Grammar. Three credit hours each Quarter. Autumn, Winter, and Spring Quarters. General prerequisites must include ten credit hours of advanced work in the classics. Mr. Bolling.

NOTE: This course is the same as Latin 720-721-722.

LATIN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

602. Latin Satire. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include a course in Latin comedy. Mr. Abbott.

The origin and development of satire as a literary form, with readings, principally from the Satires of Horace.

604. Lucretius. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include one course more advanced than Latin comedy. Mr. Abbott.

Lectures and readings on Lucretius and Epicurus; Epicureanism as a philosophical doctrine and its place in the history of Roman philosophy; reading of *De Rerum Natura*.

***607. Roman Private Life.** Three credit hours. Three lectures each week. General prerequisites must include six Quarters of college Latin. Mr. Abbott.

Reading in Latin authors, round-table discussions, and reports on special topics.

***608. Roman Art and Archaeology.** Three credit hours. Three lectures each week. General prerequisites must include six Quarters of college Latin.

Lectures, illustrated with lantern slides, on the painting, sculpture and architecture of the ancient Roman world; also the topography and development of the city of Rome. Reading in Vitruvius and Pliny, round table discussions and reports on special topics.

612. Latin Prose Composition: First Course. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include five Quarters of college Latin. Mr. Abbott.

Exercises and lectures on Latin idiom and style.

613. Latin Prose Composition: Second Course. One credit hour. One Quarter. Autumn, Winter, Spring. One recitation each week. General prerequisites must include Latin 612. Mr. Abbott.

A continuation of Latin 612. Students are expected to take this course in three consecutive Quarters. Not more than three hours credit.

615. Proseminar I. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include six Quarters of college Latin. Mr. Titchener, Mr. Abbott, Mr. Hough.

Lectures on the life and period of Cicero; readings from the Letters and Essays. Latin 615 is designed especially for students preparing to teach Latin.

* Not given in 1940-1941.

616. Proseminar II. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include six Quarters of college Latin. Mr. Titchener, Mr. Hough, Mr. Abbott.

Lectures on the life and works of Vergil, and his influence on modern literature; readings from the Eclogues and the Georgics. Latin 616 is designed especially for students preparing to teach Latin.

617. Proseminar III. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include six Quarters in college Latin. Mr. Titchener, Mr. Hough, Mr. Abbott.

Lectures on topics suggested by the study of Caesar's Gallic and Civil Wars; special consideration of literary style, political and military campaigns. Latin 617 is designed especially for students preparing to teach Latin.

627. Vulgar Latin. Three credit hours. Winter Quarter. General prerequisites must include six Quarters of college Latin, or French 801, or the consent of the instructor must be obtained. Mr. Abbott.

Lectures and the study of texts and inscriptions illustrating the development of the popular speech.

629. History of Literary Tradition. Three credit hours. Spring Quarter. Mr. Abbott.

Lectures and discussions dealing with the genesis and development of literary forms and motifs. Reading in translation largely from the fields of epic, tragedy and comedy. Students will be required to present a paper showing the influence of the classical tradition upon a major author of one of the modern literatures.

631. Private Reading and Minor Problems. Two to five credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include one reading course more advanced than Latin comedy. Mr. Titchener, Mr. Hough, Mr. Abbott.

Passages for private reading and topics for investigation will be suggested to meet the needs of individual students.

635-636-637. Advanced Translation or Technical Courses. Three credit hours. Autumn, Winter, and Spring Quarters. These courses may be repeated with different material to a maximum of nine hours each, with no more than three hours in any one Quarter. General prerequisites must include six Quarters of college Latin. Mr. Titchener, Mr. Hough, Mr. Abbott.

Selections will be made in accordance with the needs of the students from such types of literature as comedy, tragedy, epic, elegy, novel, history, political and oratorical writings, or such technical courses as paleography and epigraphy.

650-651-652. History of Roman Literature. Three credit hours. Autumn Winter, and Spring Quarters. General prerequisites must include three reading courses more advanced than Latin comedy. The content of the readings within this course is so extensive that graduate students may repeat this course for credit. Mr. Titchener, Mr. Hough, Mr. Abbott.

Lectures and assigned reading in literary histories on the development of Roman literature; required and suggested passages for translation in each author studied: brief weekly reports.

720-721-722. Historical Greek and Latin Grammar. Three credit hours each Quarter. Autumn, Winter, and Spring Quarters. General prerequisites must include ten hours of advanced work in the classics. Mr. Bolling.

NOTE: This course is the same as Greek 720-721-722.

NOTE: TEACHING COURSE. For the Teaching Course in this department see the Department of Education, Course 694.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Candidates for advanced degrees will be required to have:

(a) Some knowledge of language as such and of the place held in the history of linguistic development by the Classical Languages. To attain this end, all candidates must have at least one course in General Linguistics (Greek 701).

(b) A knowledge of Classical Literature in its broad outlines.

(c) An understanding of the principles of textual criticism, and as a means to this end, some knowledge of Paleography.

Candidates for the Doctorate will be required to attain such mastery of their major language as will enable them to express themselves in it and to interpret any document in that language set before them. Similar but less difficult tests will be applied to candidates for the Master's degree; the passages set before them for interpretation will be selected from some particular field in which they have already worked.

Candidates for the Doctorate who make one of the Classical Languages their major, must take in the other language one course, at least, from the intermediate group (600).

800. Seminar. Three credit hours. Autumn, Winter, and Spring Quarters. Mr. Titchener, Mr. Hough, Mr. Abbott.

Textual criticism and research problems. The author to be studied will be assigned by the instructor.

950. Research in Classical Languages. Autumn, Winter, and Spring Quarters. The staff.

COMPARATIVE LITERATURE AND LANGUAGE

Courses formerly offered under the above heading will be found under the Departments of Classical Languages and Literature, and German.

DAIRY TECHNOLOGY

Office, 111 Townshend Hall

PROFESSOR STOLTZ, ASSOCIATE PROFESSOR BURGWALD, ASSISTANT PROFESSOR ERB

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

605. Management of Dairy Plants. Five credit hours. Winter Quarter. Three discussion periods and one four-hour laboratory period each week. General prerequisites must include Dairy Technology 607 and 610. Dairy Technology 608 must be included in the general prerequisites or taken concurrently. Mr. Stoltz.

Lectures will be given on the organization, construction, and operation of milk plants, creameries, cheese factories, condenseries, and ice cream plants. The purchasing of milk and milk products by various methods, the importance of sanitation, employing of help, and the purchasing of supplies will be discussed. Trips will be taken to various plants weekly and written reports will be required regarding the efficiency and housekeeping of plants visited.

607. Market Milk. Five credit hours. Autumn Quarter. Three discussion periods and two three-hour laboratory periods each week. General prerequisites must include Bacteriology 607, 610, 611, and Agricultural Chemistry 605. Mr. Burgwald.

Lectures and assigned readings will be given on the handling and distribution of milk for city trade including cooling, clarifying, standardizing, pasteurizing, and bottling milk and cream and methods of determining the bacterial and leucocyte count in milk in order to comply with the regulations laid down by the various city ordinances. Laboratory will consist of practical work in handling and processing milk and the operation of the milk plant. Training and practice will be given in milk inspection from the standpoint of the Board of Health and the city milk plant.

608. **Hard Cheese Manufacturing.** Five credit hours. Winter Quarter. Two discussion periods and one eight-hour laboratory period each week. General prerequisites must include Bacteriology 607, 610, and 611. Mr. Burgwald.

Lectures will take up the methods of manufacturing cheddar, Swiss, brick, and Limburger cheese, the method of paying for milk at cooperative cheese factories and the scoring of American cheese. Laboratory work will consist of the making of cheddar cheese from both raw and pasteurized milk, Swiss cheese by the use of the eye-forming culture, brick, Limburger, and farm cheese.

609. **Condensed Milk and Dry Milk.** Three credit hours. Autumn Quarter. Two discussion periods and one three-hour laboratory period each week. General prerequisites must include Agricultural Chemistry 605 and Bacteriology 607. Mr. Erb.

A study of condensed milk and dry milk manufacture. Special emphasis will be given to the questions of heat stability of milk, the salt balance, and lactose crystallization. Laboratory work will consist of practical work in the operation of vacuum pans, sterilization of milk, and visits to milk condenseries and powder plants in the vicinity of Columbus.

610. **Ice Cream Manufacturing.** Five credit hours. Autumn Quarter. Three discussion periods and two three-hour laboratory periods each week. General prerequisites must include Agricultural Chemistry 605 and Bacteriology 607. Dairy Technology 609 must be taken concurrently. Mr. Erb.

The course deals with the modern ice cream industry and has to do with manufacturing operations, distribution methods and sales activities. Considerable attention is given to the physico-chemical aspects of ice cream and how these enter into modern processing procedure. Laboratory work consists of processing ice cream and visiting manufacturing plants.

615. **Dairy Products Scoring.** Three credit hours. Spring Quarter. One lecture and two two-hour laboratory periods each week. Mr. Erb.

An advanced class for students who are majoring in dairy technology and who desire to take up judging of milk, butter, ice cream, and cheese in the commercial field.

701. **Special Problems.** Three to fifteen credit hours, taken in units of three or five hours each Quarter, for one or more Quarters. Autumn, Winter, Spring. One hour conference each week. Mr. Stoltz, Mr. Burgwald, Mr. Erb.

This course is designed for students majoring in dairy technology and consists in working out special problems along the lines in which they are specializing.

702. **Dairy Seminar.** One credit hour. Autumn, Winter, and Spring Quarters. One hour conference each week. Open to seniors and graduate students who are specializing in dairy technology and to those who have permission of the instructor. During this seminar seniors will report on problems or special references. Graduate students will make a report of their problems. Instructors in allied departments of the University will be requested to take part in this seminar.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. **Research in Dairy Technology.** Autumn, Winter, and Spring Quarters. One hour conference each week. General prerequisites must include at least twenty hours of work in the department, and the consent of the instructor must be obtained. Mr. Stoltz, Mr. Burgwald, Mr. Erb.

Research work in Dairy Technology is conducted under the supervision of Mr. Stoltz, Mr. Burgwald, and Mr. Erb. Any apparatus or equipment on hand will be furnished and room will be arranged for those desirous of studying problems pertaining to market milk, ice cream, butter, cheese, evaporated milk, milk powder, buttermilk, or other dairy products. Students desiring to work on some problems, such as plant management, dairy bacteriology, dairy chemistry, nutrition, cost accounting, can arrange to carry on the work as though it were in one department and college.

DRAWING

(See Engineering Drawing)

ECONOMICS

Office, 116 Commerce Building

PROFESSORS WOLFE, HAYES, WALRADT, DICE, HELD, KIBLER, AND SALZ, ASSOCIATE PROFESSORS ZORBAUGH, SMART, BOWERS, JAMES, WILLIT, BITTERMANN, AND HERBST, ASSISTANT PROFESSORS PATTON, ROWNTREE, EGLE, DONALDSON, AND KIMBALL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601-602-603. Principles of Economics; Advanced Course. Three credit hours. Three Quarters. 601, Autumn; 602, Winter; 603, Spring. Three class meetings each week. Mr. James.

This course is designed to provide a more thorough and critical consideration of economic principles than is possible in the elementary courses. It attempts to arrive at some understanding of the more fundamental principles involved in the present changing economic system.

604-605. Current Economic Problems. Three credit hours. Two Quarters. 604, Autumn; 605, Winter. Three class meetings each week. Mr. Hayes.

A lecture and discussion course providing a survey and analysis of some of the leading current economic issues, especially those connected with the economic functions of the Federal administration, agricultural adjustment, development of natural resources, provision for the aged and unemployed, tariff adjustment, and industrial self-government.

613. Money and Banking: Problems and Policies. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include a course in money and banking, or the consent of the instructor must be obtained. Mr. Willit.

The work of this course includes a brief survey of banking in the United States, Canada, and England. An analysis of the recent changes in our monetary and banking system and a study of the functions of the Federal Reserve System and its place in financial planning and control.

616. Corporation Economics. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Kimball.

A course in corporation organization and finance designed primarily for students outside of the College of Commerce and Administration.

Not open to students who have credit for or who are taking Business Organization 650.

618. Transportation Economics. Five credit hours. One Quarter. Winter and Spring. Five class meetings each week. Mr. Kibler.

A general survey of the history and regulation of inland transportation agencies, and a discussion of current problems of transportation and regulation, for students with a general interest in the field of economics as well as for those with a special interest in transportation.

624. Principles of Insurance. Three credit hours. One Quarter. Autumn and Winter. Three class meetings each week. Mr. E. L. Bowers.

A study of the theory and practice of the principal types of insurance in the life, fire, and casualty fields. The economic theory of risk; loss prevention; state supervision, etc.

625-626. Analysis and Control of Business Cycles. Two credit hours. Two Quarters. 625, Winter; 626, Spring. Mr. Hayes.

A general survey of changes in price levels and production. Past and current theories of business cycles. Proposed plans for the control of economic fluctuation.

631-632-633. Public Finance. Three credit hours. Three Quarters. 631, Autumn; 632, Winter; 633, Spring. Mr. Walradt.

A study of the problems connected with the debts, expenditures, revenues, and fiscal administration of national, state, and municipal governments.

634-635. International Economic Problems. Three credit hours. Two Quarters. 634, Autumn; 635, Winter. Mr. James.

Theories of international trade and finance. Balance of international payments for important countries: war debts, export of capital, gold movements, etc. Broader aspects of international economic relations emphasized.

637. Labor Relations. Five credit hours. Autumn Quarter. Five class meetings each week. Miss Herbst.

The problems of labor considered with reference to the labor movement; the history of trade unionism; types; theories; policies; methods; legal status of trade unions; the strike; the boycott; the injunction. Types of governmental intervention.

638. Labor Legislation. Three credit hours. Winter Quarter. Three class meetings each week. Miss Herbst.

State activity in relation to labor. The operation of protective legislation relating to child labor, wages, hours. Special consideration is given to the operation of the federal National Labor Relations Act and the Fair-Labor Standards Act. Reference is made to Ohio statutes and their administration.

639. Social Insurance. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Bowers.

Efforts to guarantee to the worker security. Accident insurance; employers' and workmen's compensation; health hazards and health insurance. Old age insurance and pensions; unemployment and its prevention; unemployment insurance. Compulsory automobile insurance.

640. The International Organization of Labor. Three credit hours. Winter Quarter. Three class meetings each week. Miss Herbst.

American and foreign labor movements are viewed historically in relation to economic, political, and legal institutions. The purposes and problems of trade unionism, political activity, cooperation, and international organization of labor are included.

Not open to students who have credit for Economics 513.

643. Woman in the Modern Economic World. Three credit hours. Autumn Quarter. Three class meetings each week. Given in alternate years. Miss Herbst.

A study of the relation of women to the present economic order, and of the social, economic, industrial and legal problems associated therewith.

645-646. Consumption Economics and the Marketing System. Three credit hours. Two Quarters. 645, Winter; 646, Spring. Three class meetings each week. Economics 646 must be preceded by Economics 645. Miss Herbst, Mr. Beckman, Mr. Burley.

The first Quarter deals with: consumption economics from the standpoint of the individual and of society; the consumption problem in the price system; variations and inequalities of income; price levels and the cost of living; influences determining consumer choice; standards of economy of consumption.

The second Quarter deals with: the consumer in our marketing system; the consumer movement; consumer attitudes toward marketing institutions, advertising, salesmanship, and standardization programs; marketing and credit practices, policies and institutions, including consumers' cooperatives, which effect the consumer; and government aid and protection to the consumer.

648. Public Utility Economics. Five credit hours. Autumn Quarter. Five class meetings each week. Mr. Kibler.

A course complementary to Economics 618, with special emphasis on local public utilities, including water, gas, electric light and power, telephone and telegraph, etc. The history and present status of regulation and the leading problems arising therefrom, including supervision of holding companies, valuation, reasonableness of rates, adequacy and economy of service, etc. Public ownership versus public regulation.

651. International Commercial Policies. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Held.

The theory of international trade; historic policies; mercantilism; free trade and protection. A study of the tariff policy of the United States with a comparative study of the policies of other countries. International trade as affected by the World War.

656. The Distribution of Wealth and Income. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Hayes.

Analyses of the process by which wages, interest, rent, and profit are determined; proposals for altering same.

658-659. Population. Three credit hours. Two Quarters. 658, Autumn; 659, Winter. Three class meetings each week. Mr. Wolfe.

The growth and distribution of population. The relation of numbers to resources, productive capacity, standard of living, prosperity, and international economic problems. The dynamic aspects of population in relation to material and moral progress. Critical consideration of population theories and policies.

669. Socialism and Related Movements. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hayes.

Early utopias; the development of capitalism and protest movements related thereto such as utopian socialism, Marxian socialism, syndicalism, anarchism, cooperation, and government regulation; the socialist movement in the United States.

671. Socialism and Related Movements in Present-Day Europe. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hayes.

Economic life in Soviet Russia; economic aspects of fascism in Italy and of National Socialism in Germany; economic reform movements in Great Britain, France, and Scandinavia.

672. Socialist Theory. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Hayes.

Analysis of the doctrines of Karl Marx and of the neo-Marxists; economic problems under socialism such as the direction of the economy, apportionment of income, maintenance of efficiency, capital building, and avoidance of depressions; democracy versus authoritarianism under socialism; economic planning under capitalism.

673. Principles of Social Economy. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include ten hours of economics and ten hours of history, philosophy, political science, psychology, or sociology. Mr. Wolfe.

The intent of this course is to arrive at some insight into the meaning and criteria of ideal economy, not in its material and technological, but in its fundamental human aspects. Purposive economics in relation to fundamental human values. Fundamental values and instrumental values. The means-end relation and the principle of economy of means. Income as opportunity, and the economic criteria of distribution of opportunity. The conflict between efficiency, liberty, and the ideal use of resources, material and human. Democracy and authoritarianism in relation to economy. An economic interpretation of social conflict and social ethics.

676. World Economics and Economic Trends. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include ten hours of economics and ten hours of history, philosophy, political science, psychology, or sociology. Mr. Salz.

The leading idea underlying the course is to portray by way of analysis of current events in the various fields of industrial activity, and in various countries, those structural changes that are independent of cyclical alterations. Stabilization and security will be compared with progress; self-sufficiency with international cooperation; regulation and control with laissez-faire; self-financing with banking; planning with drifting. Actual events are interpreted as evidences of tendencies making for permanent changes in the economic and social order.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites must include good foundation courses of collegiate grade in the principles of economics, political science, psychology, European and American history.

MASTER'S DEGREE: The candidate for the Master's degree in economics must meet certain minimum requirements: (1) in the general principles of economics; (2) in the history of economic thought and processes, for which Economics 801-802-803 or its equivalent is necessary; (3) in elementary statistics, which, if it has not been taken as an undergraduate course, may be obtained by taking Economics 807; (4) An adequate preparation in the field of the thesis satisfactory to the chairman of the department and the thesis adviser.

Satisfaction of the first three requirements will be determined on the basis of a written examination given in the fourth week of the Quarter in which the degree is to be taken. Students will not be admitted to candidacy until the topics of their theses have been approved by the departmental committee on advanced degrees.

DOCTOR'S DEGREE: The candidate for the Doctor's degree in economics should have a broad and liberal training, such as will enable him to approach his work in a scientific, critical, and constructive spirit; and from a broad social point of view rather than from that of a narrow special interest. In order to attain this point of view, he should have gained familiarity with the progress which has been made not only in economics but also in the other social sciences, as well as in philosophy and psychology. A reasonable acquaintance with European and American history is presupposed. The candidate should have an elementary knowledge of calculus, and shall have a knowledge of statistics at least equivalent to Economics 807-808-809. He shall have a reading knowledge of French and German.

The more specific requirements for the Doctor's degree in economics include the following:

(1) The minimum requirements for the Master's degree as given above;

(2) Concentration in four of the following fields, one of which shall be Economic Theory; the preparation shall cover the entire field without limitation to particular courses:
(a) Economic theory;
(b) Economic history;
(c) Labor problems and economic reform;
(d) Theory of money and credit;
(e) Public finance;
(f) International economic relations;
(g) Social control of industry (transportation, public utilities, economic planning).
(3) One or more subjects taken in other departments of the university, selected with the approval of the professor in charge of the candidate's dissertation.

The adequacy of preparation in fields (2) and (3) will be tested by written and oral examinations, which must be passed before admission to candidacy. Topics for dissertations must be approved by the departmental committee on advanced degrees at least two Quarters before the degree may be taken. Detailed statements of the forms of application for examinations and approval of dissertation topics may be obtained from the chairman.

801-802. History of Economic Doctrine. Three credit hours. Two Quarters. 801, Autumn; 802, Winter. Three class meetings each week. Mr. Patton.

An account of the development of economic ideas and principles in the Western World to 1848.

803. The Political and Cultural Foundations of Economic Thought. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Patton.

An examination of the broad underlying economic, political, and intellectual forces which have affected the formulation of the problems and methods of economic thinking. The course presupposes a general knowledge of the history of economic doctrines.

804-805-806. Economic History of the United States. Three credit hours. Three Quarters. 804, Autumn; 805, Winter; 806, Spring. Three class meetings each week. Alternates with Economics 812-813-814. Mr. Smart.

807-808-809. Statistical Analysis. Two credit hours. Three Quarters. 807, Autumn; 808, Winter; 809, Spring. One two-hour class meeting each week. General prerequisites must include a basic course in mathematics and permission of the instructor. Mr. Smart.

A general course in statistical methods designed primarily to give the graduate student in economics, who intends to enter into the statistical field, a clear conception of the value of statistics to economics and business. The course will include a treatment of the methods of collection, tabulation and graphic representation of data, of analysis of statistical series of various kinds together with an interpretation of the final results.

***812-*813-*814. The Economic History of Western Europe.** Two credit hours. Three Quarters. 812, Autumn; 813, Winter; 814, Spring. Two class meetings each week. Preferably preceded or accompanied by Economics 801-802-803. Alternates with Economics 804-805-806. Mr. Smart.

A general survey from the fall of the Roman Empire to the Great War. Especial attention is given to the interrelations between the economic institutions, the general culture, and the economic thought of the various periods. The development of modern capitalism. Economic background and social consequences of the Industrial Revolution. The economic causes and implications of modern European nationalism.

815. Costs and Returns. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Rowntree.

Critical and constructive analysis of the conditions which determine costs of production. Types of cost. Differences and changes in costs. The intricacies of the relation of cost to value. Critical consideration of the history of the theory of costs and returns.

***816-*817-*818. Modern Economic Theories and Theorists.** Three credit hours. Three Quarters. 816, Autumn; 817, Winter; 818, Spring. Three class meetings each week. Alternates with Economics 871-872-873. Mr. Wolfe, Mr. Bitterman.

Critical consideration of the leading economists from J. S. Mill to the present. English and American classical and neo-classical writings, the Austrian School, and the more important continental theorists, including post-war and contemporary writers, both orthodox and unorthodox.

* Not given in 1940-1941.

825. Current Taxation Problems. Two credit hours. Winter Quarter. Mr. Walradt.

A critical analysis of the taxation problems now before the federal, state, and local governments.

826-827. Stability of Capitalism. Two credit hours. Two Quarters. 826, Winter; 827, Spring. One two-hour class meeting each week. Mr. Salz.

Adaptability versus rigidity in the capitalistic system. Functions of these characteristics in relation to the elasticity of an economic system. The capitalistic system viewed from the standpoint of mechanical and biological analogies. The variable elements in the capitalistic system in relation to stability and instability of the system as a whole. The bearing of the organization of the monetary system and the distribution of wealth and income. Comparison of capitalism, with respect to stability and instability, with other types of economic organization, historical and contemporary. The course will view the problem of capitalism broadly, not only from the strictly economic, but from the political, historical, and sociological points of view.

842. Income. Three credit hours. Spring Quarter. Mr. Hayes.

A survey of income studies in the United States as to their methods and results. The distribution of income. The utilization of income. The relation of national wealth and debt to income. Effect of changing price levels on national income.

863. Advanced Money. Three credit hours. Spring Quarter. Preferably preceded by a course in money and banking. Mr. Dice.

A study of the gold standard; the gold exchange standard; the role of money in the economic organization; the leading types of monetary theory; and the methods of stabilizing the price level.

864. Advanced Banking. Three credit hours. Winter Quarter. Three discussion periods each week. General prerequisites must include a course in money and banking. Mr. Dice.

The integration of the financial institutions; the theories of bank deposits; the theories of the elasticity of bank currency; the discount policy and the interest rate of central banks; the effectiveness of the different methods of regulating credit and business activities.

865-866-867. Public Control of Industry. Two credit hours. Three Quarters. 865, Autumn; 866, Winter; 867, Spring. Mr. Kibler.

A study of the underlying conceptions and conditions of control, the general instruments of control, and the safeguarding of consumers against exploitation. Attention is directed to the legal and constitutional background of control. Examination of various proposals for economic planning.

870. European Banking Systems. Two credit hours. Autumn Quarter. Mr. Willit.

A survey of the central banking and commercial banking systems of the leading European countries, together with a study of the current international banking and credit problems.

871-872-873. Problems in Contemporary Economic Theory. Three credit hours. Three Quarters. 871, Autumn; 872, Winter; 873, Spring. Mr. Bittermann, Mr. Wolfe.

(a) An examination of the assumptions and analytic techniques of current theoretical economics. Formal, empirical, and normative economics. Statics and dynamics. (b) Empirical techniques. (c) The aims, methods, and content of institutional economics. The relations among logic, ethics, law, history, psychology, and economics.

874. Labor and Industry. Two credit hours. Spring Quarter. Miss Herbst.

A seminar course on present-day problems confronting the wage-earner. The problems will be considered with special reference to the Trade Union Movement in this and other countries.

875-876. Problems of Capital Accumulation and Utilization. Three credit hours. Two Quarters. 875, Winter; 876, Spring. Three class meetings each week. Mr. Wolfe.

An analysis of the doctrines of economists and other writers concerning the problems of capital accumulation and utilization with especial attention to economic "progress," oversaving, thrift, industrial depressions, inequality of wealth, and the export of capital.

Not open to students who have credit for Economics 868.

877. Social Insurance Problems. Two credit hours. Winter Quarter. Mr. Bowers.

A critical analysis of social insurance problems faced by the Federal and State governments; the place of social insurance in the economic system, with special reference to its preventive aspects and stabilizing possibilities; economic aspects of administration.

***878-*879. Mathematical Economic Theory.** Two credit hours. Two Quarters. 878, Autumn; 879, Winter. Mr. Bittermann.

Analysis of problems in price and distribution theory requiring mathematics for their solution. Monopoly and monopoloid price. Development of mathematical economics.

885-886-887. Philosophical Foundations of Economics. Three credit hours. Three Quarters. 885, Autumn; 886, Winter; 887, Spring. Mr. Salz.

Philosophical and methodological foundations of economics. Analysis of the conception of Geisteswissenschaften. Fundamental assumptions. The problem of values. The relation of social to natural sciences. The development of Geisteswissenschaften in Europe. Controversial questions.

950. Research in Economics. Autumn, Winter, and Spring Quarters. Open by permission of the Chairman of the Department. Mr. Wolfe and others.

Qualified graduate students who wish to do research with the advice of members of the staff of the Department of Economics may register for this course.

EDUCATION

Office, 115 Arps Hall

PROFESSORS DAVIS, ALBERTY, EARL W. ANDERSON, BERRY, BODE, BRIM, CLIFTON, ECKELBERRY, EIKENBERRY, GOOD, HECK, HULLFISH, KLEIN, LANDSITTEL, LEWIS, PAHLOW, REEDER, SANDERSON, SEELY, STONE, STREITZ, TWISS (EMERITUS), WARNER, AND ZIRBES, ASSOCIATE PROFESSORS BENNETT, CAHOON, SMITH, AND THARP, ASSISTANT PROFESSOR EBERHART, MR. TELLER

Prerequisites for Entrance Upon Graduate Work in Education

1. A student seeking to enter upon graduate work in the field of education shall hold a Bachelor's degree from an accredited institution of higher learning and shall show familiarity with certain fields of education to the extent of what is ordinarily covered in undergraduate courses in approximately twenty-four Quarter hours. The fields in which familiarity should be exhibited include the following: (a) Philosophy of Education, (b) Educational Psychology, (c) Principles of Teaching, (d) History of Education, and (e) School Organization and Management. In demonstrating competency in such fields the student may either present official records or take a comprehensive examination.

In addition to the above requirement the student will present course credits for student teaching or provide evidence of one or more years of successful teaching experience.

2. Specific requirements to supplement the foregoing general prerequisites may be set up in the various areas of specialization. An illustration follows:

A student preparing to secure a Master's degree in the teaching of high school English, before admission to graduate work, shall meet the foregoing professional prerequisites and in addition shall show competency, either by course credits or comprehensive examination, in English equivalent to the requirement of the College of Education for graduation.

Prerequisites for 600 and 800 Courses

1. **600 courses for undergraduate and graduate credit.** Junior standing and twenty Quarter-credit hours in education and allied subjects of which ten approved by the instructor must be in education.

2. **600 courses for graduate credit only.** Graduate standing in the field of education.

3. **800 courses.** Graduate standing in the field of education and ten Quarter-credit hours in graduate courses in education approved by the instructor.

NOTE: Courses in the Department of Education are arranged under the following headings:

General and Basic, Philosophy of Education, History of Education and Comparative Education, Elementary Education, Secondary Education, Higher Education and Teacher Training, Industrial Education, Commercial Education, Superintendency, Guidance, Special and Adult Education.

All of these except the first represent areas of specialization within the Department of Education.

Courses listed in the Department of Education include those previously offered by the Departments of Adult Education, History of Education, Practical Arts and Vocational Education, Principles and Practice of Education, and School Administration.

* Not given in 1940-1941.

KEY TO COURSE NUMBERS

			Pages
General and Basic	600-606	802-806	92, 101
Philosophy of Education	610-629	807-811	93, 101
History of Education and Comparative Education	630-649	812-820	93, 101
Elementary Education	650-669	821-828	94, 101
Secondary Education	670-710	829-844	95, 102
Higher Education and Teacher Training		845-855	103
Industrial Education	712-715	856-866	97, 104
Commercial Education	721-726	867	97, 104
Superintendency	727-746	871-883	98, 105
Guidance	750-763	884-896	99, 105
Special and Adult Education	764-770	897-899	100, 105
Research		950	100

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION." page 40.

GENERAL AND BASIC

600. Minor Problems. Two to four credit hours. Autumn, Winter, and Spring Quarters. Students may, with the approval of their advisers, register for more than one section of Education 600 or for the same section two or more times.

By permission of the Chairman of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under members of the Bureau staff.

(a) Commercial Education. Mr. Stone.
(b) Elementary Education. Mr. Brim, Miss Streitz, Miss Zirbes, Mr. Warner, Mr. Heck.
(c) Guidance. Mr. Stone, Mr. Clifton, Mr. Earl W. Anderson, Mr. Heck, Mr. Smith, Mr. Love.
(d) History of Education and Comparative Education. Mr. Good, Mr. Eckelberry.
(e) Industrial Arts Education. Mr. Warner, Mr. Smith.
(f) Secondary Education. Mr. Alberty, Mr. Eikenberry, Mr. Davis, Mr. Landsittel, Mr. Eckelberry.
(g) Special and Adult Education. Mr. Berry, Mr. Heck, Mr. Nisonger.
(h) Vocational Industrial Education. Mr. Stone, Mr. Warner, Mr. Smith.
(i) Teaching of English. Mr. Seely, Mr. Eberhart.
(j) Teaching of Social Studies. Mr. Pahlow, Mr. Landsittel.
(k) Teaching of Foreign Languages. Mr. Tharp.
(l) Teaching of Biology, Physics, Chemistry, or General Science. Mr. D. F. Miller, Mr. Cahoon.
(m) Teaching of Mathematics. Mr. Cahoon.
(n) Philosophy of Education. Mr. Bode, Mr. Hullfish.
(o) Superintendency. Mr. Lewis, Mr. Reeder, Mr. Davis, Mr. Clifton, Mr. Heck, Mr. Holy, Mr. Bennett.
(p) Higher Education. Mr. Klein, Mr. Hullfish, Mr. Earl W. Anderson, Mr. Raths.
(q) Radio Education. Mr. Tyler.
(r) Visual Education. Mr. Dale.

601. Radio in Education. Two credit hours. Winter Quarter. General prerequisites must include courses in the theory and practices in secondary education and a course in educational psychology. Mr. Tyler.

A consideration of the place of radio in modern teaching with particular attention to the techniques employed in its use in the various subjects in elementary and secondary schools. Opportunity for observation and individual experimentation.

602. Visual Instruction. Three credit hours. Winter Quarter. Permission of the instructor must be obtained. The enrollment will be limited to forty-five students. Mr. Dale.

A consideration of the role of visual instruction in education; intensive study of the contribution of visual materials to educational objectives with especial attention to the research literature. Educational principles to be followed in the utilization of visual materials will be analyzed. Standards for evaluation will be critically examined.

606. Foundations of Education. Five credit hours. One Quarter. Autumn and Spring. This course is designed particularly for those beginning graduate study in the field of education. Mr. Eckelberry and others.

This course is a basic course for graduate students in education. The materials consist of a survey of major social philosophies, their biological, psychological, and historical sources and their

application in the continuous reorganization of educational agencies and procedures, including research.

Not open to students who have credit for Education 603.

NOTE: Attention is called to the service course (Psychology 680) offered for those majoring in Elementary or Secondary Education or the Superintendency.

PHILOSOPHY OF EDUCATION

607. Philosophy of Education. Three credit hours. Autumn, Winter, and Spring Quarters. Open by permission of the instructor. Mr. Bode and others.

A consideration of the distinctive function or purpose of education in the social order and the bearing of this purpose on problems of organization and administration, the selection of subject matter, and classroom procedures.

610. Conceptions of Mind in Educational Theory. Three credit hours. Autumn Quarter. Mr. Bode.

A study of the doctrines of mind that have exercised a determining influence upon educational theory and practice.

611. The Thinking Process in Its Educational Bearings. Three credit hours. Winter Quarter. General prerequisites must include Education 610. Mr. Hullfish.

A study of the thinking process for the purpose of tracing its implications for educational theory and classroom practice.

617. Modern Tendencies in Education. Three credit hours. Spring Quarter. Mr. Bode, Mr. Hullfish.

A discussion of current educational doctrines and controversies, in the light of their historic background and their philosophical implications.

620. Moral Ideals in Education. Three credit hours. Spring Quarter. Mr. Hullfish.

A consideration of types of moral ideals, of the relation of moral values to school subjects, and of the question of direct and systematic moral instruction in the schools.

624. Social Education. Three credit hours. Autumn Quarter. Lectures and discussions. Mr. Cook.

Social influences shaping the school child; the community adaptations of the school; teacher adjustments to community codes and conditions.

HISTORY OF EDUCATION AND COMPARATIVE EDUCATION

632. The History of Modern Education. Five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Good, Mr. Teller.

Not open to students who have credit for Education 507.

***633-*634. Historical and Comparative Study of Secondary Education.** 633, Autumn Quarter, two credit hours; 634, Winter Quarter, three credit hours. General prerequisites for 633 must include twenty hours in education and allied subjects including ten hours in secondary education and five hours in history of education; for 634, Education 633. Mr. Eckelberry.

A survey of the development of secondary education with intensive treatment of the American academy and high school in relation to social and political conditions and philosophies, and in comparison with present secondary schools in Europe.

It is recommended that students do not register for Education 633, unless they expect to register also for Education 634.

635. The Evolution of Educational Thought. Five credit hours. Spring Quarter. Given in alternate years. Mr. Good.

A study from the sources of the great philosophies of education in relation to their times; and an evaluation of their influence on present educational thought and practice. The thought of the Greek, Roman, Renaissance, and the modern democratic and industrial thinkers will be studied.

639. Great Teachers. Two credit hours. Spring Quarter. One two-hour lecture each week. Mr. Good.

Study of the times, personalities, and work of several eminent teachers: Socrates, Plato, Jesus, Quintilian, Agassiz, Arnold and others.

* Not given in 1940-1941.

641. The History of Vocational Education. Three credit hours. Spring Quarter. One two-hour meeting each week. Given in alternate years. Mr. Good, Mrs. Pressey, Mr. Stewart, Mr. Stone.

The history of activities related to agriculture, commerce, industry, and home making as a part of education, and their relation to the general theory and practice of education.

642. History of Physical and Health Education. Three credit hours. Spring Quarter. Given in alternate years.

An historical survey of physical and health education beginning with the physical education of ancient Greece, with special emphasis on recent and contemporary developments in Europe and America.

ELEMENTARY EDUCATION

651. Major Sequence in Childhood Education. Three credit hours. Autumn Quarter. Mr. Brim.

A comprehensive survey of the educational needs of children between infancy and adolescence, with particular reference to the adjustment of learning experiences, materials, and procedures to successive levels of child development.

652. Major Sequence in Childhood Education (Continued). Three credit hours. Winter Quarter. Miss Zirbes.

A critical study of the changing elementary school from the standpoint of evaluation; a consideration of the social and psychological implications of current issues involved in the reconstruction of elementary education.

653. Major Sequence in Elementary Education. Three credit hours. Spring Quarter. Miss Streitz.

A graduate course in which elementary school principals, supervisors, superintendents and others interested in leadership in elementary education will study the practical problems of school and curriculum organization and procedure. This will include study of the demonstration school in action.

655. Industrial Arts for Teachers in Elementary Schools. Three credit hours. Winter Quarter. Mr. Warner.

First-hand study of typical modern industries as one means of developing understanding and insight into social and economic backgrounds and their implications. Criterion characterization of industrial arts in the program of elementary education. Selection, study, and development of many typical problems with reference to the various levels of the elementary school, in addition to planning the physical setting required.

Not open to students who have credit for Education 523.

658. Problems in the Direction and Supervision of Elementary Teacher Training. Three credit hours. Spring Quarter.

An intensive study of the problems confronting the director of training, the supervisors of student teachers and critic teachers. Special attention is given to the development of the teacher as a person, enriched content courses, reorganization of methods courses, more intimate relation of theory and practice, widening the scope of practice teaching, and creative supervision of student teaching.

661. Problems of Elementary Teachers in Service. Two credit hours. One Quarter. Autumn and Winter. Participation in special projects and investigations, wtih reports. Open by permission of the instructor to principals and teachers in service. Miss Streitz, Mr. Helsabeck.

The work will center about ways and means of improving instruction through actual attack on selected classroom problems.

662. Laboratory Problems in Child Development. Three credit hours. Spring Quarter. General prerequisites must include Education 651-652. Miss Zirbes.

Workshop in Elementary Education. Registration in the course is restricted to students with professional experience and is subject to instructor's approval.

Not open to students who have credit for Education 827.

664. Health Education for Teachers. Three credit hours. Spring Quarter. Three lecture periods each week. Mr. Oberteuffer.

A consideration of the teacher's responsibility for practicing and maintaining high standards of personal hygiene and health, and a first-hand study of the environmental and social conditions and problems of community health.

SECONDARY EDUCATION

670. Teaching Literature in the High School. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures each week: observations. Mr. Seely, Mr. Eberhart.

Emphasis will fall upon the selection of suitable poetry, drama, prose-fiction, etc., for junior and senior high-school pupils; developing methods for their presentation and study; and suggesting means for correlating the work in literature with the other high-school studies.

671. Teaching Composition in High School. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures each week: observations. Mr. Seely, Mr. Eberhart.

This course will be devoted to the discussion of the methods of teaching grammar and composition, and to means of developing originality, imagination, and individuality in the oral and written expression of high-school pupils.

***672. Teaching Composition in High School.** Three credit hours. Lectures, conferences, readings. This course is the more advanced part of Education 671 (offered during the year). It may be elected by teachers and other persons of maturity who are not required to elect all of Education 671. (Students who will do practice teaching in English may not elect this course since they will elect Education 671 during the Autumn or Spring Quarter.) Mr. Seely.

This course will be devoted to the materials and methods of teaching the language fundamentals, oral composition, and written composition.

†674. The Teaching and Supervision of Journalism in Secondary Schools. Three credit hours. Mr. Lawrence.

This course is designed for teachers of journalism in secondary schools and for faculty advisers of school publications. It deals with both methods and content, with emphasis on those aspects which are of special value to teachers.

Not open to students who have credit for Education 546.

675. Spoken English: Teachers' Course. Three credit hours. Winter Quarter. Miss Sanderson.

Classroom lectures and discussion designed to assist teachers of public speaking and debating in secondary schools. The nature of speech training in the secondary schools. Definite suggestions on the following: how to prepare students for debating and speaking contests; speech delivery; speech composition; classroom reports. This is not a course in speech practice.

677. Organizing History for the Classroom. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures each week: observations. Mr. Pahlow, Mr. Landsittel.

A professionalized subject-matter course surveying the field of high school history as a whole and organizing it into smaller units for teaching purposes.

678. The Teaching of the Social Studies. Five credit hours. One Quarter. Autumn, Winter, Spring. Five lectures each week; observations. Mr. Landsittel, Mr. Pahlow.

This course deals with the history of the teaching of history and the other social studies; aims and methods; classroom and library equipment; evaluation of textbooks; testing.

681. Laboratory Practicum for Teachers of Science. Two to five credit hours. Autumn Quarter. Demonstrations, construction and using of apparatus, trips. General prerequisites must include Education 683 or 684 or equivalent, and major or minor in one or more of the following: physics, chemistry, physics-chemistry, general science, biology. Mr. Cahoon.

Students will have experience in working with such techniques as glass blowing, wood and metal working, chemical techniques, electrical circuits and devices, and photographic and visual aids as related to apparatus materials and tools used in science courses in secondary and elementary schools. Students will make use of these techniques in assembling and constructing demonstration and laboratory apparatus for use in various science courses. Techniques and projects will be adapted to the needs and interests of individual students or teachers.

Not open to students who have credit for Education 539.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

683. The Teaching of Biology. Three credit hours. Spring Quarter. Three recitations each week: observations. Mr. Tiffany, Mr. D. F. Miller.

The work will include lectures and demonstrations with discussion of the best methods of presenting botany, zoology, and biology to high school students.

684. The Teaching of General and Physical Science. Three credit hours. Spring Quarter. Lectures, reading, observations. Mr. Cahoon.

A study of the problems and techniques in the teaching of general and physical science courses in junior and senior high schools. Objectives, planning, use of demonstrations and laboratory experiments, construction and use of tests, texts and reference materials, pupil projects, trips, teaching, and evaluating scientific thinking, directed study, visual aids, professional literature.

687. The Teaching of Mathematics in Secondary Schools. Three credit hours. Autumn Quarter. Lectures, readings, obsevations. M. Cahoon.

A consideration of mathematics concepts, skills, and appreciations important for all pupils in the secondary school, and of teaching techniques related thereto. Purposes and outcomes; changing emphases and trends in mathematics teaching; function concept; planning; directed study; texts and reference materials; testing; mathematics clubs; important topics and techniques in junior high school mathematics, algebra and geometry; professional literature. Selected important topics will be presented as illustrative of modern teaching methods adaptable to the secondary school.

690. The Teaching of German. Three credit hours. Winter Quarter. Three recitations each week: observations. Mr. Kramer.

Values. Critical study of objectives and methods. Textbook selection. Classroom procedures. Readings, discussions, and reports.

692. Methods and Techniques of Teaching Romance Languages. Five or seven credit hours. Autumn Quarter. Five meetings each week, combined and sectional: observations. Mr. Tharp.

Lectures, readings, discussions and conferences.

Values. Objectives. Demonstrations and lectures on methods of teaching reading, grammar and pronunciation. Textbook analysis. Professional advancement. Examinations and marking. Eight observations of high school classes required.

Sections. Techniques of instruction. During the fourth to ninth weeks inclusive the class will meet four days a week in sections according to subject. The work of each section carries two hours of credit, and students may enroll in any sections for which they possess the prerequisites.

Section A. French. Mr. Tharp.
Section B. Spanish. Mr. Tharp.

Lesson plans. Problems of presentation in the reading lesson, grammar, pronunciation. Construction of teaching materials. Choice of course content. Evaluation of classroom procedures.

694. The Teaching of Latin. Three credit hours. Spring Quarter. Three recitations each week: observations. Mr. Hough.

Values. Teachers' equipment, objectives and methods. Classroom procedures. Lectures and assigned readings.

696. The Teaching of Mechanical Drawing I. Three credit hours. Autumn Quarter. One lecture and two three-hour laboratory periods each week: observations. Mr. French.

Objectives and methods in teaching the language of graphics. Reading, visualizing, translating. Writing, freehand and with instruments. Theory of shape description, orthographic and pictorial projection. Theory of size description. Intersections and developments. Lettering.

697. The Teaching of Mechanical Drawing II. Three credit hours. Winter Quarter. One lecture and two three-hour laboratory periods each week: observations. General prerequisites must include Education 696. Mr. French.

Lettering in design. Bookplates. Heraldry in design. Methods of graphic reproduction. Planning a secondary school course, content, arrangement, methods of presentation, standards, examinations and grading. Drawing room and office equipment.

699. Extra-curricular Activities of Secondary School. Three credit hours. Spring Quarter. Mr. Eikenberry.

The principles, organization, administration and supervision of extra-curricular activities. Consideration will be given to home-room activities, pupil participation in school government, assemblies, clubs, publications, debating and dramatics, athletics, honor societies, social activities, control of participation in activities, and financial administration of activities.

701. Major Course in Secondary Education I. Five credit hours. Autumn Quarter. This course is required of all graduate students whose field of specialization is secondary education. Mr. Eikenberry.

A comprehensive survey of secondary education.

702. Major Course in Secondary Education II. Five credit hours. Winter Quarter. This course is required of all students whose field of specialization is secondary education.

A continuation of Education 701.

***704. Laboratory Study in Secondary Education.** Three credit hours. Mr. Alberty and University School staff.

A graduate course in which secondary school principals, supervisors, superintendents and others interested in leadership in secondary education will study the demonstration school in action with the advantage of planned guidance and interpretation, contacts, and conferences with the staff. In addition to the general problems of the course, there will be opportunities for students to select individual topics for special study, and to consider the bearings of education transition on their own work in the field.

INDUSTRIAL EDUCATION

714. Selection and Organization of Subject Matter in Industrial Education. Three credit hours. Spring Quarter. Three recitation periods each week. Mr. Smith.

Principles and practice in defining specific area and course objectives and their relationship to the objectives of general education. General and specific criteria and controls determining the selection of subject matter and activities. Techniques of analysis applied to various industrial activities for the selection of facts and activities conducive to acquisition of desirable knowledge, skills, and behavior; and the organization of such materials into integrated courses of study and formulation of teaching plans.

715. Laboratory Planning for Industrial Arts. Three credit hours. Autumn Quarter. Seven periods each week for lecture and laboratory. Permission of the instructor required. Mr. Warner.

Analysis of problems and standards involved in planning rooms and practice in the selection, design, location, installation, and care of equipment in various high school industrial arts laboratories or vocational shops.

COMMERCIAL EDUCATION

721. Fundamental Principles of Teaching Commercial Subjects. Three credit hours. One Quarter. Autumn and Winter. Miss Wells.

A basic course in fundamental principles of teaching the commercial subjects. This course will orient the teachers in the entire field of commercial teaching in secondary schools and provide the background necessary for specialized courses 725 and 726.

***722. Principles of Commercial Education.** Three credit hours. Five recitations and one conference period each week.

For teachers of commercial subjects in the junior or senior high school. Meaning, purpose, and scope of commercial education in secondary schools. Importance of and procedure in making occupational surveys in the field of commercial education.

†724. Administration and Supervision of Commercial Education. Three credit hours. Five recitations and one conference period each week.

A course designed for administrators and supervisors of commercial education in the junior and senior high school. Courses of study: laboratory facilities, selection and improvement of teachers in service; and other major executive problems.

†725. Selecting and Teaching Junior High School Commercial Subjects. Three credit hours. Education 721 must be included in the general prerequisites or taken concurrently.

A professional course for teachers of commercial arts (sometimes designated as general business science or junior business training) in junior high school for major purposes of exploration, guidance, and fundamentals of consumer business education. Teaching plans and observation of classroom procedures.

* Not given in 1940-1941.
† Not given during the academic year, 1940-1941.

*726. **Selecting and Teaching Senior High School Commercial Subjects.** Two to four credit hours. Education 721 must be included in the general prerequisites or taken concurrently.

A professional course for teachers of senior, technical or vocational commercial high school commercial subjects, including shorthand, typewriting, business English, office practice, bookkeeping, salesmanship, commercial law, commercial geography, commercial arithmetic, etc. Teaching plans and observation of classroom procedures.

SUPERINTENDENCY

727. **Introduction to School Administration.** Five credit hours. Autumn Quarter. Required of graduate students preparing for school executive positions. Mr. Reeder.

Designed to give an overview of the organization and administration of education in the United States, and especially designed for persons who expect to become school executives. The following topics, among others, are discussed: federal, state, and local administrative organization for education; the function of school administration; finance and business management; the plant; the teaching corps; the pupils; the curriculum; textbooks and libraries; and records, reports, and public relations.

Agencies and instruments in school government. Development of school codes, rules, and regulations. Relation of rules and regulations to philosophy of administration. Assigned readings, investigations, and reports.

729. **Administration of Rural and Village Schools.** Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Clifton.

An analysis of the administrative duties of the chief school administrator of consolidated and village schools. This course places particular emphasis on problems of transportation, methods of adjustment for small enrollment and other problems peculiar to rural and village schools.

†731. **Administration of Physical and Health Education.** Three credit hours. Assigned readings and reports. Education 727 must be included in the general prerequisites or taken concurrently.

The study of the responsibility of administrators for the direction and supervision of health and physical education; organization, management and financing of programs; methods of securing and advising health and physical education staff; duties and services of these special officers; relations to public health; medical inspection; preventive programs; promotional programs; relations to mental health and hygiene; management and financing of athletics.

*733. **Administration of School Financial Accounting in Ohio.** Two credit hours. Assigned readings, problems and reports. Education 727 must be included in the general prerequisites or taken concurrently.

A study of the sources of school revenue and the financial accounting systems in use in Ohio school districts including a consideration of underlying principles and legal regulations as well as actual practice in preparing budgets, financial statements and contracts, auditing payrolls, and the supervision of such clerical details as the keeping of books, minutes, and other records.

735. **Business Administration of Schools.** Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Reeder.

Function of business administration in the schools; administrative relationships; personnel of the business department; making the budget; procuring revenue; financial accounting; planning and constructing a building; architectural service; selecting and purchasing building sites; financial capital outlays; use of buildings; maintenance of the plant; the janitor; insurance of property; taking the inventory; school supplies; payroll procedure; school transportation.

738. **Administration of Pupil Personnel.** Three credit hours. One Quarter. Winter and Spring. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Clifton.

Compulsory education laws and working certificates of Ohio; main requirements in other states. Census information it should secure, its use, legal requirements in different states. Attendance—organization of departments, amount and causes of non-attendance, devices to improve attendance. School record systems—forms used, items recorded, and uses. Reporting systems—

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

need of uniformity in recording and reporting systems. Age-grade-progress studies. Elimination, grading and promotion. Classification. Definition of terminology. Visiting teacher. Marking systems.

740. Public School Relations. Two credit hours. Autumn Quarter. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Reeder.

Emphasizes the function of public relations in school administration and the means for securing desirable public relations. The following topics, among others, are discussed: the aims and criteria for desirable public relations; the superintendent and the board of education in the school-relations programs; American Education Week; commencement as a school-relations agency; and organizing and conducting a publicity campaign.

742. Legal Aspects of School Administration. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Clifton.

A study of the laws and judicial decisions of various states, relating to education, in order to discover the legal principles involved. Major topics; authority and responsibility of teachers; rights, privileges, and responsibilities of students; teachers' contracts and pensions; legal and illegal use of school property; contractural capacity and liability of public school officials; school boundaries and districts; taxation; legal aspects of the curriculum; expenditures of school money. Primarily for supervisory and administrative officials.

†744. Administration of Teacher Retirement and Pension Systems. One credit hour.

A general introductory treatment of the problems involved in creating and maintaining an adequate retirement system for the teachers of a state.

***746. Administration of School Libraries.** Two credit hours. Four lectures each week. Assigned readings and reports.

Designed to meet the needs of school librarians and general administrative school officers. Principal topics: history and development of the school library; its place in educational systems; standards and state regulations; rooms, equipment, and budgets; selection, acquisition, and care of books; publicity and cooperation with other agencies; instruction in the use of books, relation of librarian to teachers and school officials.

GUIDANCE

750. Fundamentals of Guidance. Five credit hours. Autumn Quarter. Mr. Stone.

A basic but advanced course for all students desiring a comprehensive knowledge of the history, theory, and practices of guidance. Especially for graduate students desiring to major in personnel. The course will consider the aims of guidance, materials, techniques, counseling, and research instruments of all major divisions of student personnel service.

751. Supervised Practice in Counseling. Three credit hours. Autumn Quarter. One two-hour recitation and discussion period and two hours laboratory each week. Lectures, reports, demonstrations, and laboratory practice. General prerequisites must include Education 750 or Psychology 640, and permission of the instructor. Mr. Nisonger, Mr. Smith, Mr. Love, Mr. Edgerton.

Consideration of counseling problems at different school levels including out-of-school youth. Studies of counseling techniques and aids. Practice in counseling with young people, parents, class and homeroom teachers, visiting teachers, administrative officers, school physicians, psychologists, psychometrists, psychiatrists, employers, and others. Of interest to those preparing to counsel with youth.

752. Guidance through Social-Economic Studies. Five credit hours. Spring Quarter. General prerequisites must include Education 750, or permission of the instuctor. Mr. Stone.

This course is organized with particular reference to the needs of school advisers and teachers of social-economic (vocational) studies for major purposes of guidance.

754. The Administration of Guidance Programs. Three credit hours. Spring Quarter. General prerequisits must include Education 750. Mr. Clifton.

Designed for school superintendents and high school principals and other executive officers in junior and senior high schools and junior colleges. Critical examination of the organization

* Not given in 1940-1941.
† Not given during the academic year, 1940-1941.

and administration of guidance programs in large and small school systems; the development of guidance programs for the school systems represented by the class membership.

SPECIAL AND ADULT EDUCATION

764. Supervised Teaching in Special Classes. Five credit hours. Spring Quarter. Mr. Berry.

Practice teaching for qualified students in classes for the mentally retarded, for behavior problem children, for the defective in speech, or for the deaf and the hard of hearing.

Students will be expected to devote one-third of their time, under the supervision of the University instructor in charge, to this course.

†765. Principles and Methods of Teaching the Mentally Retarded. Three credit hours. Mr. Berry.

A critical study of the various methods which are used in teaching the mentally retarded. In connection with this course, opportunity for practice teaching mentally retarded children will be provided for students desiring it.

†766. Principles and Methods of Teaching Behavior Problem Children. Three credit hours. Autumn Quarter. Mr. Berry.

A critical study of principles and methods used in the adjustment of behavior problem children.

767. Administration of Special Education. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings, reports, and field trips. General prerequisites must include Education 727 or permission of the instructor in charge must be obtained. Mr. Heck.

History and development of special schools and classes; types defined; place in education; state encouragement and regulations; types of control; internal government; buildings and rooms; equipment; costs, teacher-training, experience, salaries; selection of other employees; characteristics of children; principles governing admittance, retention, and withdrawal; curriculum—academic, industrial, extra-curricular; methods of follow-up, etc.

770. Adult Education. Three credit hours. Winter Quarter. Mr. Nisonger.

A study of the nature, extent, and significance of adult education. Consideration of the psychological characteristics of the adult, influence of social and economic factors on adult needs, history and types of adult education, present trends, future development.

NOTE: For additional courses in special and adult education, see the Bureau of Special and Adult Education, page 59.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40, also on page 90.

950. Research in Education. Autumn, Winter, and Spring Quarters. Students may, with the approval of their advisers, register for more than one section of 950 or for the same section two or more times.

By permission of the Chairman of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under members of the Bureau staff.

(a) Commercial Education. Mr. Stone.
(b) Elementary Education. Mr. Brim, Miss Zirbes, Miss Streitz, Mr. Warner, Mr. Heck.
(c) Curriculum Techniques. Mr. Charters.
(d) Guidance. Mr. Stone, Mr. Clifton, Mr. Warner, Mr. Smith, Mr. Earl W. Anderson, Mr. Heck.
(e) Higher Education. Mr. Klein, Mr. Hullfish, Mr. Raths.
(f) History of Education. Mr. Good, Mr. Eckelberry.
(g) Industrial Arts Education. Mr. Warner, Mr. Smith.
(h) Philosophy of Education. Mr. Bode, Mr. Hullfish.
(i) Secondary Education. Mr. Alberty, Mr. Eikenberry, Mr. Davis, Mr. Landsittel, Mr. Eckelberry.
(j) Special and Adult Education. Mr. Berry, Mr. Heck, Mr. Nisonger.
(k) Superintendency. Mr. Lewis, Mr. Reeder, Mr. Davis, Mr. Clifton, Mr. Heck, Mr. Holy, Mr. Bennett.
(l) Teaching of English. Mr. Seely, Mr. Eberhart.

† Not given during the academic year, 1940-1941.

(m) Teaching of Social Studies. Mr. Pahlow, Mr. Landsittel.
(n) Teaching of Foreign Languages. Mr. Tharp.
(o) Teaching of Mathematics. Mr. Cahoon.
(p) Teaching of Science. Mr. Cahoon.
(q) Vocational Industrial Education. Mr. Stone, Mr. Warner, Mr. Smith.

GENERAL AND BASIC

802. The Preparation of Theses and Other Scientific Reports. Three credit hours. Winter Quarter. Open with permission of the instructor. Mr. Reeder.

Emphasizes methods of research with special emphasis upon the preparation of theses. The following topics, among others, are treated: types of research; criteria for selecting and planning the problem; preparing the working and the final bibliographies; the securing of data; the organization, presentation, and interpretation of material; the form of citations; and the preparation of statistical tables and illustrations.

804. Educational Experimentation. Five credit hours. Spring Quarter. Miss Zirbes, Mr. Raths.

A consideration of significant aspects of the changing educational situation with particular reference to their implications for research. Methods of investigation and techniques of experimentation applicable to the evaluation of current trends in elementary, secondary and higher education.

806. Techniques of Curriculum Construction. Five credit hours. Autumn Quarter. Open to students who have completed one year of graduate work in education. Mr. Charters.

This course deals with those techniques of curriculum construction which are used in the assembling of raw materials for the curriculum; the techniques for the determination of objectives; activity, trait, and difficulty analysis; the evaluation of activities; sampling, interviewing; and other techniques connected with the collection of raw material.

PHILOSOPHY OF EDUCATION

811. Seminar: Special Problems in Educational Theory. Three credit hours. One Quarter. Autumn, Winter, Spring. Mr. Bode, Mr. Hullfish.

HISTORY OF EDUCATION AND COMPARATIVE EDUCATION

814. Comparative Education. Five credit hours. Winter Quarter. Lectures and research. General prerequisites must include ten hours in the history of education. Mr. Eckelberry.

A survey of the present school systems of selected countries such as England, France, Germany, Russia, Canada, Argentine Republic, Australia, Denmark in comparison with the United States; and the study of topics such as the relation of national and local government to education; the sources of school support; the preparation of teachers; the methods and agencies of adult education.

816. Seminar in the History of Education. Two to five credit hours. Winter Quarter. Required of all candidates for advanced degrees specializing in the history of education. General prerequisites must include fifteen hours in the history of education. Mr. Good, Mr. Eckelberry.

ELEMENTARY EDUCATION

824. Curriculum Problems in Elementary Education. Three credit hours. Autumn Quarter. General prerequisites must include Education 651-652. Mr. Brim.

A critical study of the reorganization, construction, and administration of the elementary school curriculum in the light of modern educational principles and objectives, the data contributed by research and the best current practices found throughout the country. Special attention will be given to organization of staff for curriculum study, to the basic issues in realizing a sound curriculum and to the installation, adaptation and administration of the revised curriculum.

825. Elementary School Administration and Supervision. Three credit hours. Spring Quarter. General prerequisites must include Education 651-652. Miss Streitz.

A critical analysis of current practice in the organization, administration, and supervision of the elementary school. Formulation of guiding principles and effective program, practical implications of creative democratic leadership in efficient management, in the diagnosis of teaching, in the professional development of personnel, in the creative use of school and community activities, and in the broader public and professional relations of the school.

***826. Practice in Supervision.** Three credit hours. Spring Quarter. Alternative with Education 827. General prerequisites must include Education 825. Miss Zirbes.

Typical school problems will be used to provide practice in the techniques of supervisory service. Emphasis will be placed on the application of principles of supervision to actual classroom situations.

828. Seminar in Elementary Education. Two to five credit hours. Autumn Quarter. General prerequisites must include fifteen hours of graduate work in education, approved by the instructor. Miss Streitz, Miss Zirbes.

SECONDARY EDUCATION

829. High School Administration and Supervision I. Five credit hours. Winter Quarter. General prerequisites must include Education 701 and 702. Mr. Davis.

A comprehensive survey of the major problems and issues in administration and supervision of the secondary school.

830. High School Administration and Supervision II. Five credit hours. Spring Quarter. General prerequisites must include Education 701 and 702. Mr. Eikenberry.

An advanced course in the specialized techniques of high school administration.

831. The Secondary School Curriculum. Five credit hours. Spring Quarter. General prerequisites must include Education 701. Mr. Alberty.

A critical study of the construction, reorganization and administration of secondary school curricula and programs of study.

***832. The Junior College.** Three credit hours. Winter Quarter. General prerequisites must include Education 701 and 702. Mr. Klein.

The origin and development of junior colleges, including a critical survey of the several types: private, state and municipal. The place of the junior college in secondary education and readjustments in secondary and higher education that result from the junior college movement.

†833. Evaluation of Secondary Schools. Three credit hours. General prerequisites must include Education 701 and 702 or their equivalent. Lectures, reports, field studies. Mr. Eikenberry.

A critical study of techniques of evaluating secondary schools with particular reference to the techniques developed by the Cooperative Study of Secondary School Standards and the Commission on the Relation of School and College of the Progressive Education Association.

834. Supervised Field Service in Education. Three to five credit hours. Autumn, Winter, and Spring Quarters. Open only to students who hold the degree of Bachelor of Science in Education from The Ohio State University or its equivalent. Open only by arrangement with the Director of Student Teaching. Mr. Landsittel and supervisors.

Supervised teaching or other approved educational service under compensated appointment in a system of schools for a minimum, in conjunction with Education 835, of half of a school year, half-time throughout the year or full-time for half of the year. Critical pre-study of objectives, instruments, and procedures and after-evaluation; a general appraisal of the total experience or certain aspects thereof to form in all cases an integral part of the master's thesis.

Open only to candidates for the Master's degree in a teaching field in The Ohio State University. Credit to be withheld until eligibility for the degree otherwise has been attained.

* Not given in 1940-1941.
† Not given during the academic year, 1940-1941.

835. Supervised Field Service in Education. Three to five credit hours. Autumn, Winter, and Spring Quarters.

A continuation of Education 834.

†836. School Surveys. Three credit hours.

A study of the literature and methods of school surveys, as a basis for the investigation of practical problems in school administration and supervision.

837. Seminar in Secondary Education. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Education 701 and 702. Mr. Alberty, Mr. Eikenberry, Mr. Davis.

A seminar for advanced graduate students whose field of specialization is secondary education.

*838. The Teaching and Supervision of English in the Secondary Schools. Three credit hours. Conferences, readings, reports. General prerequisites must include Education 670 (670a and 670b) and 671 (672) or permission of the instructor. Mr. Seely.

The course consists of two phases: (1) the analysis of contemporary contributions to the reorganization of materials and methods of secondary school English; (2) the study by each student of an individually selected problem.

839. Seminar in the Teaching of the Social Studies in the Secondary Schools. Three credit hours. One Quarter. Autumn and Spring. Mr. Pahlow.

842. Seminar in the Teaching of Mathematics and Physical Science. Two or more credit hours. Autumn and Spring Quarters. One two-hour period each week. Problems of minor or major research in the teaching of the physical sciences and mathematics in secondary schools. Required of all students who are working toward an advanced degree in this field. General prerequisites must include a minimum of twenty Quarter-credit hours in mathematics or physical science approved by the instructor. Mr. Cahoon.

843. Seminar in the Teaching and Supervision of Foreign Languages. Three credit hours. Winter Quarter. General prerequisites must include thirty Quarter-credit hours, or the equivalent by course credit approved by the instructor or by comprehensive examination, in a foreign language taught in secondary schools. Mr. Tharp.

HIGHER EDUCATION AND TEACHER TRAINING

845-846. Higher Education I; Higher Education II: Basic Courses. Five credit hours. Autumn and Winter Quarters. The work of each Quarter is so arranged that either course may precede the other. General prerequisites must include ten Quarter-hours in secondary education and the satisfaction of basic course requirements for all graduate students in education. Open only to graduate students majoring in higher education, including teacher training. Mr. Klein, Mr. Hullfish.

A basic survey of problems in higher education, particularly as these relate to theory, history, organization and administration, curriculum and method, and student personnel, including measurement.

*847. Theory and Administration of Higher Education. Five credit hours. Winter Quarter. General prerequisites must include five hours in education approved by the instructor and the satisfaction of basic course requirements for all graduate students in education. Mr. Klein.

This course will study the theoretical and practical problems involved in the administration of institutions of higher education under modern social conditions.

848. Curriculum and Method of Higher Education. Five credit hours. Spring Quarter. General prerequisites must include five hours in higher education and the satisfaction of basic course requirements for all graduate students in education. Mr. Hullfish.

A study of the development, principles, and administration of the curriculum and of teaching methods in higher education.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

850. Teacher Training. Five credit hours. Autumn Quarter. General prerequisites must include five hours in higher education and satisfaction of basic course requirements for all graduate students in education. Mr. Earl W. Anderson.

A study of the problems of history, organization, administration, curriculum and method, student personnel (including measurement) peculiar to teacher training institutions.

852. Achievement Tests in Higher Education. Three credit hours. Winter Quarter. One two-hour period each week. Mr. Raths.

A course for college instructors and research workers, to acquaint them with the techniques used in measuring attainment in the several fields of college instruction. Each student will carry on an examination project in his field.

INDUSTRIAL EDUCATION

856. Practicum in Industrial Arts Education. Three to five credit hours. Winter Quarter. Mr. Warner.

Investigations, reports and discussions concerning: nomenclature, historical development; analysis of professional objectives for their concepts; emphasis by grade levels; criterion basis of content selection and appraisal; teaching methods and devices; physical planning; organization; laboratory operation; evaluation; the teacher and his profession.

857. Administration of Industrial Education in Secondary Schools. Three credit hours. Spring Quarter. Mr. Stone.

Relation of Industrial Arts and Vocational Education to the general curriculum and the administrative responsibilities entailed. Courses of study; relative costs; coordination problems; class and shop organization, and the development of an effective program of supervision. Selection of teachers and their improvement in service.

860. Scientific Studies in Industrial Arts and Industrial Vocational Education. Two credit hours. Autumn Quarter. Mr. Warner, Mr. Smith.

An extensive view of research techniques applicable to the practical arts and vocational education; critical review and evaluation of published research examples in these fields; recognition and refinement of problems; study of research treatment; methods of writing and presenting research reports.

By permission of the Chairman of the Department of Education and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

862. Seminar in Practical Arts and Vocational Education. Two credit hours each Quarter. Winter and Spring. General prerequisites must include Education 860. Mr. Warner, Mr. Smith.

Development of research problems. Topical reports and discussions. Preparation of theses or dissertations.

By permission of the major professor and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

†866. Research in the Laboratory of Industries. Three or more credit hours. Conferences and studies using the activities in the Laboratory of Industries as a basis for research. In addition to the general prerequisites, teaching experience in Industrial Arts or Vocational Industrial Education and permission of the instructor are required. Mr. Warner.

Individual or group studies on a combination practicum and laboratory basis with the publication of either a professional or technical bulletin as a goal. Selection to meet the requirements of the group are suggested by: pupil study, diagnosis and achievement; problems of organizing and supervising a Laboratory of Industries; units of content; studies of industry; analysis of method; experimentation and development of programs.

COMMERCIAL EDUCATION

867. Seminar in Commercial Education. Three credit hours. Autumn Quarter. General prerequisites must include Education 721, 722, and 724. Mr. Stone.

A seminar for advanced graduate students whose field of specialization is commercial education.

† Not given during the academic year, 1940-1941.

SUPERINTENDENCY

†871. **Administrative Problems of the City Superintendent.** Three credit hours. Five lectures each week and assigned readings and reports. Mr. Lewis.

An advanced course for city superintendents. A study of the social and legal status of the city superintendent; his civic and economic relationship to agencies of the community; an intensive study of specific problems of immediate and outstanding importance in their relationship to the administration of a city school system such as: N.R.A., finance, county reorganization, educational bearings of recent social and economic development, locally and nationally.

873. **Staff Personnel Administration.** Four credit hours. Autumn Quarter. General prerequisites must include Education 727. Mr. Lewis.

Definitions; rise of industry, government and education; philosophy of; man analysis and job analysis; selection; interviewing; in-service training; appraisement; supervision; absenteeism; marital condition; promotion; contracts, certification, dismissal, health and recreation; ethics, morale; public and professional relations; pensions; tenure; salary schedules and other factors of economic and professional welfare.

875. **School Finance.** Three credit hours. Autumn Quarter. Three lectures each week. Assigned readings, investigations and reports. Education 727 must be included in the general prerequisites or taken concurrently. Mr. Reeder.

The literature and sources of data; trends of school costs; outlook for future costs; possible school economies; school expenditures vs. ability to expend; sources of school revenues; meeting a financial stringency; the equalization of educational opportunity; the control of school funds; school indebtedness.

878. **Federal and State School Administration.** Three credit hours. Winter Quarter. Three lectures each week. Assigned readings, investigations and reports. General prerequisites must include Education 727. Mr. Clifton.

Present conditions and the program of the federal department of education and of the departments of education of the several progressive states. The adjustment between national and state programs and the relationship of both of these to local administrative agencies. The state administration of the schools of Ohio.

880. **Planning, Constructing, and Equipping School Buildings.** Five credit hours. Autumn Quarter. Assigned readings, observation trips, reports. General prerequisites must include Education 727. Mr. Holy.

A study of the major problems involved in determining the school building needs of a community, techniques for determining room requirements, types of buildings, their construction and adaptation to educational needs, school sites and present day equipment for school buildings, including types and arrangement of equipment for special and regular rooms, auditoriums, gymnasiums, libraries, cafeterias, offices, service systems, methods of selecting and purchasing equipment.

882. **Seminar in School Administration.** Two to five credit hours. Autumn, Winter, and Spring Quarters. At least one Quarter required of majors in the Superintendency. General prerequisites must include Education 727. Mr. Lewis, Mr. Reeder, Mr. Heck.

Specifically designed to aid students preparing masters' and doctors' theses. Students required to meet once a week as a group for discussions and direction.

GUIDANCE

†884. **Seminar in Guidance.** Three credit hours. General prerequisites must include Education 750 and 754.

A seminar for advanced graduate students whose field of specialization is guidance.

SPECIAL AND ADULT EDUCATION

897. **Seminar in Special Education.** Three to five credit hours. Spring Quarter. In addition to the general prerequisites, graduate standing in the Department of Education or Psychology, and permission of the instructor are required. Mr. Berry.

† Not given during the academic year, 1940-1941.

†898. Planning Community Adult Education Programs. Three credit hours. General prerequisites must include Education 770 and permission of the instructor must be obtained. Mr. Nisonger.

A study of community agencies with adult education programs; how new programs may be developed in terms of needs which are not being met.

NOTE: For additional courses in special and adult education, see the Bureau of Special and Adult Education, page 59.

ELECTRICAL ENGINEERING

Office, 171 Robinson Laboratory

PROFESSORS DREESE, CALDWELL (EMERITUS), BIBBER, AND EVERITT, ASSOCIATE PROFESSORS KIMBERLY, ASSISTANT PROFESSORS TANG, BOONE, EVANS, AND HIGGY, MR. WILLIAMS, MR. KUNZE, MR. DAVIS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The following courses do not carry graduate credit for a student who received the degree of Bachelor of Electrical Engineering from The Ohio State University: 603, 604, 607, 611, 642, 643, 661, 701, 702, 703, 705, 706, and 741.

603. Alternating Current Circuits. Five credit hours. One Quarter. Summer, Autumn, and Winter. Five class hours each week. Mr. Tang, Mr. Evans.

Resistance, inductance, capacitance, reactance, impedance, mutual inductance series and parallel circuits, complex circuits, coupled circuits, power, power factor, polyphase systems. Complex notation, network theorems, and transients in simple circuits.

604. Alternating Current Laboratory. Two credit hours. One Quarter. Summer, Autumn, and Winter. Three laboratory hours each week. Electrical Engineering 603 must be taken concurrently. Mr. Tang, Mr. Evans.

Laboratory study of wave forms, series and parallel circuits, phase differences, polyphase circuits, coupled circuits, and network theorems.

607. Engineering Electronics. Four credit hours. One Quarter. Autumn and Winter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 603 or equivalent. Mr. Boone.

The fundamental phenomena of electron behavior in electric and magnetic fields, electron emission, electric conduction in gases, characteristics and applications of high vacuum and gas-filled electronic equipment.

611. Medium and High Frequency Circuits. Five credit hours. One Quarter. Winter and Spring. Three class hours and one three-hour laboratory period each week. General prerequisites must include Electrical Engineering 603. Mr. Kunze, Mr. Tang.

General analysis of alternating current circuits under wide ranges of frequency and impedance conditions. Fourier analysis, network theorems, resonance phenomena, modulation, bridge circuits, and coupled circuits. Alternating current measurements at medium and high frequencies.

642. Electrical Engineering. Four credit hours. One Quarter. Autumn, Winter, Spring. Three class hours and three laboratory hours each week. Mr. Kimberly, Mr. Davis.

The electric current and its effects. Direct and alternating current circuits. Electrical measurements. Magnets and their application. Electric heating. D-c generators, d-c motors and their control.

† Not given during the academic year, 1940-1941.

643. Electrical Engineering. Four credit hours. One Quarter. Autumn, Winter, Spring. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 642 or equivalent. Mr. Kimberly, Mr. Davis.

A continuation of electrical engineering fundamentals. Transmission and distribution. A-c motors and their application and control, a-c generators, meters, power and energy rates, power factor correction, transformers, economics of engineering applications, illumination, rectification, and thermionic devices.

661. Electrical Engineering Survey. One-half credit hour. Autumn Quarter. One class hour each week. Mr. Bibber.

A course of lectures designed to give electrical engineering students some insight into other fields of thought.

701. Alternating Current Apparatus. Four credit hours. One Quarter. Autumn and Winter. Four class hours each week. General prerequisites must include a course in direct current apparatus and Electrical Engineering 603 and 604. Electrical Engineering 705 must be taken concurrently. Mr. Dreese.

Theory of transformers, induction motors, synchronous generators, synchronous motors and apparatus.

702. Alternating Current Apparatus. Four credit hours. One Quarter. Winter and Spring. Four class hours each week. General prerequisites must include Electrical Engineering 701 and 705. Electrical Engineering 706 must be taken concurrently. Mr. Bibber.

Continuation of Electrical Engineering 701.

703. Advanced Alternating Current Circuits. Four credit hours. Autumn Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 611. Mr. Everitt, Mr. Bibber.

The propagation of alternating currents over long lines, loading, electrical filters, inductive interference.

705. Alternating Current Machinery Laboratory. Three credit hours. One Quarter. Autumn and Winter. Five laboratory hours each week. Concurrent, Electrical Engineering 701. Mr. Kimberly.

Laboratory study accompanying Electrical Engineering 701.

706. Alternating Current Machinery Laboratory. Three credit hours. One Quarter. Winter and Spring. Five laboratory hours each week. Concurrent, Electrical Engineering 702. Mr. Bibber.

Continuation of Electrical Engineering 705.

711. Generation, Transmission, Distribution, and Utilization of Electric Power. Four credit hours. Winter Quarter. Three class hours, and three laboratory hours each week. General prerequisites must include Electrical Engineering 703. Mr. Bibber.

A comprehensive view of the methods of generating electric power by thermal and water power plants, especial attention being devoted to the electrical aspects of such plants, a detailed consideration of electric power transmission and distribution, and a study of the utilization of electric power in industry. Laboratory covers high-voltage phenomena and advanced a-c machinery.

712. Generation, Transmission, Distribution, and Utilization of Electric Power. Four credit hours. Spring Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 607 and 711. Mr. Bibber.

A continuation of Electrical Engineering 711. Inspection trips may replace some laboratory hours.

717. Communication Engineering. Four credit hours. Winter Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 703 and 607. Mr. Everitt.

Equalizers, coupled circuits at radio frequency, impedance matching networks, and the use of vacuum tubes as oscillators, amplifiers and detectors at medium and high frequencies.

720. Electrical Illumination. Four credit hours. Winter Quarter. Three class hours and three laboratory hours each week. Mr. Tang.

Illumination, its development and present methods. Modern light-sources, and modification of light by reflectors, globes and other accessories. Light phenomena associated with illumination, such as reflection, transmission and absorption, direction and diffusion, refraction and color. Infra-red and ultra-violet radiation. Applications of illumination to industrial work, buildings, street-lighting, aviation, light-projection, etc.

722. Electrical Illumination. Three credit hours. Autumn Quarter. Three class hours each week. Mr. Tang.

Modern lighting, both electric and daylight, especially as applied to buildings, such as industrial plants, stores, schools, residences, etc. A brief study of lamps and accessories and the phenomena of reflection, transmission, glare, diffusion, color, etc., as they affect illumination design. Circuits for electric lighting and their control.

726. Advanced Electrical Communication. Four credit hours. Spring Quarter. Three class hours and three laboratory hours each week. General prerequisites must include Electrical Engineering 717. Mr. Everitt.

An advanced study of medium and high frequency alternating current circuits. Radiation fields and their measurement.

732. Engineering Projects. Four credit hours. Winter Quarter. Six hours in calculation periods each week. General prerequisites must include Electrical Engineering 741, 611, and Mechanics 607. Mr. Dreese.

A study of electrical projects involving a correlation of the fundamental principles of mechanics, heat, finance and electrical engineering for some desired end. Another important objective of the course is to inculcate the spirit of the attack on an engineering problem and to demonstrate the interplay of factors involved in a decision by an engineering organization.

741. Economics and Organization of the Electrical Industry. Three credit hours. Autumn Quarter. Three class hours each week. General prerequisites must include a course in direct current apparatus and Electrical Engineering 603 or 642 and 643. Mr. Bibber.

Financial calculations of electrical enterprises, examples being taken from power and communication utilities, and manufacturing. Economic aspects of the principal divisions of the electrical industry, and a study of the organizations existing in power supply, communication, electrical manufacturing and merchandising.

760-761-762. Advanced Theoretical Study of Electrical Engineering Practice and Equipment. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. All instructors.

765-766-767. Special Advanced Laboratory. Credit hours to be arranged. Autumn, Winter, and Spring Quarters. All instructors.

770. Analysis of Electrical Engineering Problems. Three credit hours. Spring Quarter. Three class hours each week. General prerequisites must include Electrical Engineering 603. Mr. Dreese.

The content will be selected from the following fields: theory of equations, differential equations, Heavyside operators. The applications will be illustrated by examples from electrical engineering and related fields.

780. Engineering Industrial Problems. Three credit hours. Spring Quarter. Three class periods each week. General prerequisite must include Electrical Engineering 701 or 702, or 642 or 643. Mr. Kimberly.

Layout of electrical distribution systems for factories and municipalities, electrolysis investigation, special cases of electric drive and control, engineering aspects of patents.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include foundation courses in mathematics, physics and electrical measurements.

The general prerequisites include for 821 and 824, Electrical Engineering 701 and 702, or equivalent; for 825, Electrical Engineering 824; for 826, Electrical Engineering 824; for 832, Electrical Engineering 717, or equivalent.

Graduate work will be given to individual students and groups under the course numbers given below. The following are the fields of special interest of the instructors listed. Other lines of study, are, however, taken up under their supervision. Mr. Dreese, Electrical Machinery. Mr. Caldwell, Illumination. Mr. Bibber, Transmission and Distribution, Alternating Current Apparatus, Electric Traction. Mr. Everitt, Electrical Communication. Mr. Kimberly, Electrical Instruments, Alternating Current Apparatus. Mr. Tang, Illumination, Alternating Current Apparatus, Electrical Mathematics. Mr. Boone, Electronics.

801-802-803. Advanced Theoretical Study of Electrical Engineering Practice and Equipment. Credit hours to be arranged. Autumn, Winter, and Spring Quarters.

805-806-807. Advanced Laboratory Study of Electrical Engineering Equipment. Credit hours to be arranged. Autumn, Winter, and Spring Quarters.

811. Matrices in Electrical Engineering. Three credit hours. Spring Quarter. Mr. Tang.

A study of the fundamentals of matrix algebra, followed by the application of matrices to the solution of general static networks. Symmetrical components. Problems of three-phase circuits, and n-terminal networks, will be considered. This course serves as a good introduction to the application of tensor algebra to electrical engineering problems.

815. Heaviside's Operational Calculus. Three credit hours. Autumn Quarter. Mr. Bibber.

A review of classical methods for the solution of transients in electric circuits, followed by a study of the special technique introduced by Oliver Heaviside and developed by Carson, Bush, Berg, and others. The principles of superposition, formation of the impedance function, distributed parameters, unit function, driving point and transfer indicial admittance, infinite integral theorem, the Heaviside expansion theorem and its use.

816. Heaviside's Operational Calculus. Three credit hours. Winter Quarter. Mr. Bibber.

A continuation of Electrical Engineering 815 covering the following: methods for the evaluation of operational expressions, shifting and transfer formulas, use of the functions of a complex variable, operational equivalents of the Fourier series and integral treatments of networks, fractional order derivatives, and the series expansion of operators.

821. Revolving Fields and Permeances in Electrical Machinery. Three credit hours. Autumn Quarter. Three class hours each week. Mr. Dreese.

An analysis of the various revolving and stationary fields found in electrical machinery. The origin and effects of both useful and parasitic fluxes are considered. Discontinuities and cusps in speed-torque curves of induction machines, synchronous-motor effects in induction machines, sub-synchronous speeds in induction and synchronous machines, and design for sub-synchronous operation are topics studied in this course.

822. Revolving Fields and Permeances in Electrical Machinery. Three credit hours. Winter Quarter. Three class hours each week. Mr. Dreese.

Continuation of Electrical Engineering 821.

824-825-826. Advanced Synchronous Machine Theory. Three credit hours. Autumn, Winter, and Spring Quarters. Three class hours each week. Mr. Bibber.

Review of fundamental considerations, general development of theory of symmetrical components, application to unbalanced loads on generators and systems, transient characteristics of synchronous machines, and system stability.

831. Transmission Networks. Three credit hours. Winter Quarter. Three class hours each week. General prerequisites must include Electrical Engineering 703 or equivalent. Mr. Everitt.

General treatment of four terminal networks, such as long lines, filters and equalizers,

including design of composite filters; use of matrices in analysis; operation of filters in parallel. The use of the Fourier integral in analysis of transients.

832. Electromagnetic Radiation and Radiating Systems. Three credit hours. Spring Quarter. Three class hours each week. Mr. Everitt.

Scalar and vector fields. Maxwell's equations, electromagnetic radiation and propagation, antenna systems, including a study of current literature.

833. Electro-Acoustical Systems. Three credit hours. Autumn Quarter. Three class hours each week. Mr. Everitt.

Study of the production, transmission, and utilization of acoustic energy by electrical means. Microphones, loud speakers, horns, the laws of mechanical vibrating systems and their coupling to electrical networks, the laws of sound propagation, and the acoustic treatment of sound enclosures.

841. Advanced Electronics. Three credit hours. Winter Quarter. Mr. Boone.

Analysis of potential distribution in triodes and in equivalent triodes; effects of space charge. Kinetic theory of ideal gases as applied to electric conduction. Velocity and energy distributions for a degenerate electron gas; thermionic emission from pure metals and from composite surfaces. Photoelectric emission. Electric arc and glow discharges; initiation and extinction of the plasma. Application to gaseous rectifiers.

842. Electron Optics. Three credit hours. The Quarter. Three class hours each week. General prerequisites must include Electrical Engineering 607 or equivalent. Mr. Boone.

Fundamental theory. Electrons as corpuscles and as waves; analogies between light and electrons. The electron trajectory; coordinate systems; conformal representation. Graphical and mechanical methods of determination of electron trajectories. Electron lenses. Magnification. Aberrations. Electron multipliers. The electron microscope. Applications to television equipment.

950. Research in Electrical Engineering. Autumn, Winter, and Spring Quarters. All instructors.

NOTE: Detailed schedules of graduate studies available under the above course number may be obtained on application to the Department of Electrical Engineering.

ENGINEERING DRAWING
Office, 218 Brown Hall

PROFESSORS FRENCH AND PAFFENBARGER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

701. Chemical Machine Drawing. Two credit hours. Winter Quarter. Six laboratory hours each week. Mr. Paffenbarger.

The drawing and introduction to the design of machinery and apparatus as related to industrial chemistry and chemical engineering.

704. Chemical Plant Layout and Design. Four credit hours. Spring Quarter. Twelve laboratory hours each week. General prerequisites must include Engineering Drawing 701. Mr. Paffenbarger.

Sketching and preliminary layout of industrial chemical plants. Design and drawing of a complete plant for the manufacture of a chemical or related product.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Education, Courses 696 and 697.

ENGINEERING EXPERIMENT STATION

The Engineering Experiment Station is a division of the College of Engineering and was established by law to conduct technical research. The Station is authorized to cooperate with divisions of the State and National governments and with private individuals and corporations.

In many cases the Station investigations are such as may properly be con-

ducted by graduate fellows working under direction of members of the faculty or Station staff. It follows, therefore, that not infrequently candidates for a graduate degree work out their theses or dissertations utilizing the equipment of the Station.

ENGLISH

Office, 120 Derby Hall

PROFESSORS FULLINGTON, McKNIGHT, GRAVES, BECK, PERCIVAL, HATCHER, WALLEY, AND DERBY, ASSOCIATE PROFESSORS SNOW AND WILSON, ASSISTANT PROFESSORS PARKER, ESTRICH, AND BEACH, MR. LOGAN, MR. UTLEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

General Information for Graduate Students:

(1) Graduate study in English requires an undergraduate major in English (i.e., not less than forty Quarter hours in "600" courses related to English, twenty-five of which shall be in the English department). Students deficient in this respect in order to qualify for admission to candidacy for the M.A. degree, must be prepared to make up the deficiency by taking such extra work as the department may deem necessary. This will entail a longer period of residence.

(2) The graduate courses elected in preparation for the M.A. degree in English may be confined to courses offered by the English department, but this extreme concentration is not required. A student is not only permitted, but urged, to elect related courses (not exceeding one-third of his entire program) offered by other departments. Courses recognized as suitable for such election are the graduate courses in foreign languages, in history, and in philosophy, and the following additional courses: Psychology 607, 621, 626, 630, 631, 645; Education 617, 670 (670-a, 670-b), 671 (672); Music 601, 602, 603, 605; Fine Arts 654; Political Science 621, 622, 623; Speech 618, 633, 635, 637, 660, 664, 665, 844, 850, 870. (Speech 811 and 824 are acceptable for students whose study in English is centered in the field of languages.) Other courses, to be acceptable, must have the approval of the Graduate Committee of the English Department.

(3) The faculty adviser of the student shall examine the student's preparation in English and in allied subjects and plan with him a suitable program of graduate study, including reading which is not a specified part of any particular course. The student is expected to consult with the instructor in charge of any "800" course before enrolling in it.

(4) Graduate study in the English Department may be centered in the field of literature or of language.

For the M.A. degree in English literature a candidate must offer evidence of (a) a detailed knowledge of two of the principal periods as presented in the cycles, (b) a knowledge of the history of the English language and literature. For the detailed program the student should consult his adviser.

To satisfy partially the first requirement, candidates for the M.A. degree in literature must complete three courses in one of the following cycles:

Cycle I. The Middle Ages. English 652, 653, 654.
Cycle II. The Renaissance. English 674, 676, 671, 677.
Cycle III. The Age of Enlightenment. English 635, 636, 637.
Cycle IV. The Age of Democracy. English 641, 642, and one of the following: English 609, 610, 655, 670.
Cycle V. English Language. English 651, 646, 627.

In general, the student is urged to take the courses in the Cycle in the indicated order. However, courses may be taken in any order (except in Cycle IV) and the time may be extended over a longer period. To complete the first requirement, it is expected that the candidate will have completed one other Cycle (or its equivalent) as an undergraduate. If he has not, he is expected to make up the deficiency either in course or out of course. It is further expected that the candidate will take at least one seminar in literature.

NOTE: Courses in the Cycles may be elected by qualified students as freely as any other courses. Students electing one Cycle may choose at will from the general elective courses and the courses in other Cycles. Students not majoring in English need pay no attention to the Cycles.

The requirement of the Cycle does not apply to students who entered upon their graduate major before the Autumn Quarter of 1934-1935. However, they may conform to these requirements at their own option.

For the M.A. degree in English language a candidate must offer evidence of (a) a general knowledge of phonetics and language history, (b) a detailed knowledge of the stages in the development of the English language and an acquaintance with the literary history which forms a background in the development of the language, and (c) a detailed knowledge of one period of English literature as represented in one of the Cycles. It is expected that the candidate will have

acquired the knowledge indicated in (c) as an undergraduate. If he has not, he is expected to make up this deficiency either in course or out of course.

(5) The test of qualification for admission to candidacy for the M.A. degree will be a written examination taken by students who have fully satisfied the entrance requirements and who have completed thirty hours of graduate work.

(6) The Master's thesis should normally develop in one of the graduate courses concerned with the student's field of major interest. A maximum credit of five hours may be allowed for the completion of the thesis and the required reading out of course.

605. Studies in Criticism. Three credit hours. Spring Quarter. Mr. Beck.

A study of modern literary criticism, with some consideration of the historical figures whose theories have influenced present-day criticism. An effort is made to discover the principles of modern literary critics through a study of the writings in which they have set forth their theories and of the reviews in which they apply these theories.

609. American Literature to the Civil War. Five credit hours. Autumn Quarter. Mr. Beach.

The literature of puritanism; the impact of the Enlightenment; the beginnings of American poetry, drama, and fiction; the growth of a national literature; the achievements of American romanticism in the work of Irving, Bryant, Whittier, Longfellow, Cooper, Hawthorne, Lowell, Holmes, Poe, Melville, Thoreau, and Emerson.

Not open to students who have credit for English 608.

610. American Literature from Whitman to the Contemporary Period. Five credit hours. Winter Quarter. Mr. Beach.

Whitman; American humor and ballad literature; the literature of the frontier; Mark Twain; the local colorists; the rise of realism; Howells and Henry James; the aesthetic and naturalistic revolts; the poetic revival; literary tendencies since the World War.

Not open to students who have credit for English 608.

627. History of the English Language. Three credit hours. Autumn Quarter. Required of students majoring in English who elect Cycle V. Mr. McKnight.

A brief study of the English language prior to Chaucer, followed by a more detailed study of the later development of the language and the way it became standardized in grammar and vocabulary. Especial attention is paid to the modern period, to the history of pronunciation and spelling, and the development of the rules which govern modern English usage.

635. The Literature of the Restoration. Five credit hours. Autumn Quarter. Required of students majoring in English who elect Cycle III. Mr. Wilson.

Life and lyrics in the age of Charles II; Satire and controversy—Dryden, Rochester, and Butler; Dramatic Essays and Heroic Drama; the Comedy of Manners and the Comedy of Tears; "The Character" and *The Spectator*.

636. The Literature of the Enlightenment. Five credit hours. Winter Quarter. Required of students majoring in English who elect Cycle III. Mr. Percival.

The course of the Enlightenment with some reference to continental types and ideals. The breakdown of neo-classicism and the rise of romanticism. The novels of Defoe, Fielding, Richardson, Sterne, and Smollett. The plays of Goldsmith, Sheridan, and others. Swift's satire, the poetry of Pope, Goldsmith, Gray, Burns, and Blake.

637. Men and Manners of the Enlightenment. Five credit hours. Spring Quarter. Required of students majoring in English who elect Cycle III. Mr. Percival.

A study of the minds, personalities, and social backgrounds of typical figures of the Enlightenment. Half of the time will be given to Boswell and Johnson. Other figures taken up will be Samuel Pepys, Lord Chesterfield, Lady Mary Wortley Montagu, Horace Walpole, Edward Gibbon, Thomas Paine, and Edmund Burke.

641. The Romantic Era. Five credit hours. One Quarter. Autumn, Winter, Spring. Required of students majoring in English who elect Cycle IV. Mr. Derby, Mr. Snow, Mr. Logan.

The influence of the French Revolution and the preeminence of the Romantic ideal. Wordsworth, Coleridge, Byron, Shelley, Keats, Hazlitt, Lamb, De Quincey, Scott, and Jane Austen.

642. The Victorians. Five credit hours. One Quarter. Autumn, Winter, Spring. (For students majoring in English who elect Cycle IV, prerequisite,

English 641.) Required of students majoring in English who elect Cycle IV. Mr. Beck, Mr. Derby, Mr. Snow.

The spirit and temper of the Victorian period as seen in the poetry of Tennyson and Browning, the essays of Carlyle and Ruskin, three representative Victorian novels, the poetry and prose of Arnold, the Pre-Raphaelites, and the later minor Victorians.

643. Literature and Composition. Five credit hours. Spring Quarter. Three lectures with conferences on individual work each week. Special permission necessary. Mr. Snow.

Ten recent writers selected from the following: Hughes, Faulkner, Galsworthy, Conrad, Hemingway, James, Cather, Mansfield, Huxley, Cabell, Anderson, and Woolf will be read and discussed as a basis for creative and critical writing, and as illustrative of tendencies in contemporary writing. The course is primarily a composition course.

646. Middle English. Five credit hours. Winter Quarter. Required of students majoring in English who elect Cycle V. General prerequisites must include English 651. Mr. Utley.

This course deals with the transition from the highly inflected Anglo-Saxon to the comparatively free idiom of modern English; with the influence of Old-French; and with the emerging of standard English from the older dialects. The reading is done in the original with emphasis on the standard dialect.

651. Old English. Five credit hours. Autumn Quarter. Required of students majoring in English who elect Cycle V. Mr. Estrich.

Attempt is made to link English with the kindred Germanic languages and by means of the words and constructions of early English to explain the nature of English in use today.

*652. Early Ballads, Lyric and Drama. Five credit hours. Autumn Quarter. Required of students majoring in English who elect Cycle I. Given in alternate years.

A study of popular songs and ballads and of the first stages in the history of the English drama.

653. Chaucer and His Period. Five credit hours. Winter Quarter. Required of students majoring in English who elect Cycle I. Mr. McKnight.

A study of Chaucer's principal works and the literary forces by which he was influenced.

654. English Medieval Literature to Chaucer. Five credit hours. Autumn Quarter. Given in alternate years. Required of students majoring in English who elect Cycle I. Mr. McKnight.

A study by means of modern English renderings of epic poetry in early English and the related epic stories in other literatures, followed by a study of legends, lays, and romances. Arthurian romance is made a central feature.

655. The Novel. Five credit hours. Winter Quarter. Four meetings each week with special reading in lieu of the fifth meeting. Mr. Hatcher.

A study of the novel, not as an historical survey, but as a preferred international art form from Trollope and Flaubert to the present day. An acquaintance is assumed with the standard authors, such as Fielding, Scott, Austen, Dickens, and Thackeray.

657. Versification. Five credit hours. Spring Quarter. Special permission necessary. Class enrollment limited to twenty-five. Mr. Graves.

The theory of verse structure with a history of the principal English verse rhythms and forms, and practice in verse composition.

658. The Short Story. Five credit hours. Winter Quarter. Special permission necessary. Class enrollment limited to thirty. Mr. Graves.

Lectures on structure and form in the short story, extended readings and reports, practice in story writing.

664. The Literary Revival in Ireland. Five credit hours. Spring Quarter. Four meetings each week and a fifth at the option of the instructor. Class enrollment limited to twenty. Mr. McKnight.

Subjects for study: Ossianic literature of the eighteenth century and the modern Irish revival. Attention is paid to works by Lady Gregory, W. B. Yeats, A. E., George Moore, Fiona Macleod, J. M. Synge, James Stephens, Lennox Robinson, James Joyce, and others.

* Not given in 1940-1941.

670. Recent and Contemporary Drama. Five credit hours. Spring Quarter. Four meetings each week with special reading in lieu of the fifth meeting. Mr. Hatcher.

The social, intellectual, and scientific forces characteristic of recent times reflected in the artistic medium of the plays of Ibsen, Strindberg, Hauptman, Wedekind, Kaiser, Toller, Chekov, Gorky, Andreyev, Brieux, Rostand, Maeterlinck, Vildrac, Capek, Molnar, Schnitzler, Pirandello, Benavente, Wilde, Shaw, Galsworthy, O'Casey, Milne, Howard, Rice, Barry, O'Neill, and others.

671. Seventeenth Century Literature. Five credit hours. Winter Quarter. Mr. Walley.

Non-dramatic literature of the later Renaissance. The growth of scientific curiosity and skepticism. The ascendancy of classical ideals. Religious reaction and Puritanism. The poetry of Milton, Donne, Jonson, Herrick, and the poets of church and court. The prose of Bacon, Burton, Browne, Walton, Bunyan, the character writers and essayists.

Not open to students who have credit for English 659.

674. The English Renaissance. Five credit hours. Autumn Quarter. Mr. Parker.

The tone and temper of the Renaissance abroad. Its development in English literature (excluding drama) from the early humanists to the death of Elizabeth; the growth of lyric poetry, the sonnets, the rise of English prose, the Tudor translations, the books of travel, the poetry of Spenser.

676. Shakespeare. Five credit hours. Autumn Quarter. Mr. Walley.

A critical consideration of the art, personality, and achievement of Shakespeare in the light of Renaissance culture. Reading and interpretation of the complete works with particular attention to the major problems of Shakespearean scholarship.

677. Elizabethan Drama. Five credit hours. Spring Quarter. Mr. Wilson.

A historical and critical study of English popular drama (exclusive of Shakespeare) and of the theater from the beginning of the reign of Elizabeth to the closing of the theaters in 1642.

701. Minor Problems in English. One or more credit hours. Summer, Autumn, Winter, and Spring Quarters.

750. Master's Thesis. Summer, Autumn, Winter, and Spring Quarters. Staff.

NOTE: TEACHING COURSES. For the Teaching Courses in this department see the Department of Education, Courses 670 and 671.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

***801. History of the Short Narrative in English.** Two credit hours. Autumn Quarter. Given in alternate years. One two-hour session each week. Mr. Graves.

An historical and critical survey of short story types in English from the Middle Ages to the Twentieth Century. Individual investigation and term thesis required.

802. The Lyric. Two credit hours. Autumn Quarter. Given in alternate years. One two-hour session each week. Mr. Graves.

A study of the characteristics of lyrical poetry with a history of the lyric in English literature. Individual investigations and term thesis required.

815. Studies in the Seventeenth Century. Five credit hours. Winter Quarter. Four sessions each week. Mr. Parker.

***816. Studies in Literary Theory.** Five credit hours.

825. Studies in Modern English Language. Five credit hours. Winter Quarter. Given in alternate years. One two-hour session each week. General prerequisites must include English 627 or its equivalent. Mr. McKnight.

Individual topics will be assigned for study of features of modern British and American English.

Not open to students who have credit for English 810.

* Not given in 1940-1941.

827. **Studies in Contemporary Literature.** Five credit hours. Winter Quarter. Four sessions each week. Mr. Hatcher.

Subject for investigation will be romance and critical realism in the second and third decades of the Twentieth Century.

Not open to students who have credit for English 809.

*830. **Old English Literature.** Five credit hours. Spring Quarter. Given in alternate years. Five class meetings each week. General prerequisites must include English 651. Mr. Estrich.

Reading of *Beowulf* and other Old English literature.

835. **Studies in the Age of Enlightenment.** Five credit hours. Spring Quarter. Four sessions each week. Mr. Percival.

Not open to students who have credit for English 818.

844. **Studies in the Victorian Period.** Five credit hours. Spring Quarter. Four sessions each week. Mr. Logan.

845. **Studies in the Romantic Peroid.** Five credit hours. Autumn Quarter. Four sessions each week. Mr. Derby.

Not open to students who have credit for English 824.

855. **Studies in the Period of Chaucer.** Five credit hours. Autumn Quarter. One two-hour session each week. General prerequisites must include English 653. Mr. McKnight.

Individual topics will be assigned in the study of writers and movements of the period.

Not open to students who have credit for English 811.

865. **Studies in American Literature.** Five credit hours. Spring Quarter. Four sessions each week. Mr. Hatcher.

Individual problems in the late Romantic Period.

Not open to students who have credit for English 814.

875. **Studies in the Renaissance.** Five credit hours. Spring Quarter. Four sessions each week. General prerequisites must include three courses in Cycle II or two courses in the cycle with the third concurrent or special permission of the instructor. Mr. Walley.

Individual problems.

*880. **Bibliography and Method.** Five credit hours. Autumn Quarter. Given in alternate years. Five sessions each week. General prerequisites must include at least forty-five hours in the Graduate School. Mr. Parker.

A course for the advanced graduate student in the methods and tools of documentary research.

890. **Problems in Advanced Research.** Five credit hours. Winter Quarter. Three to five class meetings each week. General prerequisites must include one year of graduate work in English and the permission of the instructor. It is expected that research begun in this course will be completed in English 891.

891. **Problems in Advanced Research.** Five credit hours. Spring Quarter. Three to five class meetings each week. General prerequisites must include English 890.

Continuation of English 890.

950. **Research in English.** Autumn, Winter, and Spring Quarters.

This course is to be used only for dissertation registration of candidates for the degree of Doctor of Philosophy. The candidate should consult the adviser in charge of his major.

PUBLIC SPEAKING

(See Speech)

ENTOMOLOGY

(See Zoology and Entomology)

* Not given in 1940-1941.

EUROPEAN HISTORY
(See History)

FARM CROPS
(See Agronomy)

FINE ARTS
Office, 104 Hayes Hall

PROFESSORS HOPKINS, FANNING, BAGGS, AND ROBINSON, ASSOCIATE PROFESSORS FREY, BRADLEY, SHERMAN, AND ROOS, ASSISTANT PROFESSORS RANNELLS, GRIMES, AND GATRELL, MR. ANDERLA

Requirements for the degree of Master of Arts. For properly qualified students two curricula, Technical and Non-technical, are offered, each leading to the degree of Master of Arts. To receive this degree students must have at least a "B" average in forty-five credit hours of 600, 700, or 800 courses, as listed in the curricula below; must complete a satisfactory thesis as required for all candidates for the Master's degree; and must pass a comprehensive examination after the completion of course credit and the acceptance of the thesis. The thesis may be written in the historical or non-technical curriculum, or, in the technical curriculum, may consist of painting, sculpture, design, or ceramic work. In any case a written statement of the problems and solutions, with illustrations showing the results is required.

CURRICULUM IN FINE ARTS
(TECHNICAL)

Fine Arts	(661) 5	Fine Arts	(662) 5	Fine Arts	(663) 5
Fine Arts	(801) 5	Fine Arts	(802) 5	Fine Arts	(803) 5
*Non-technical	5	*Non-technical	5	*Non-technical	5

*NOTE: For non-technical credit, selection may be made from the following allied courses: Fine Arts 654, 656, 670, 671, 804, 805, 806, or courses in history, literature, or philosophy approved by the adviser.

CURRICULUM IN FINE ARTS
(NON-TECHNICAL)

Fine Arts	(670) 2	Fine Arts	(672 or 674) 2	Fine Arts	(654, 656, or 677) 5
Fine Arts	(671) 3	or		Fine Arts	(803) 5
Fine Arts	(801) 5	Fine Arts	(676) 3	*Fine Arts	(806) 5
*Fine Arts	(804) 5	Fine Arts	(673) 3		
		Fine Arts	(802) 5		
		*Fine Arts	(805) 5		

* With the consent of the adviser, substitutions of other graduate subjects outside the Department of Fine Arts may be made when the special interest of the student warrants it. For combination curricula the student should consult the Department of Fine Arts in regard to proper sequence of courses.

The subject of the thesis, technical or non-technical, should be filed with the department before the second term of graduate study. The faculty member under whom the major work of the student is done has charge of the thesis and should be consulted early in the program of study so that all courses may contribute to the preparation of the thesis.

Students whose general education, maturity, and experiences justify it may be admitted to courses without becoming candidates for the degree and pursue subjects for which they are qualified.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

600. The Theory and Practice of Teaching Art. Five credit hours. Winter Quarter. Five periods each week with outside laboratory assignments, observations and required readings. Miss Robinson.

A course dealing with the teaching and supervision of art in the elementary, middle and high schools.

625. Advanced Life Drawing. Five credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include a course in drawing from life. Mr. Sherman.

Advanced problems in drawing from life and figure composition.

645-646-647. Portrait Painting. Five credit hours. Autumn, Winter, and Spring Quarters. Five three-hour periods each week. Mr. Hopkins.

Painting from life. The organization and development of pictures with special reference to the delineation of character.

650. Methods and Materials of the Painter. Three credit hours. Autumn Quarter. General prerequisites must include Fine Arts 645-646-647. Mr. Grimes.

A study of painting materials, the composition of pigments, binders, and varnishes. A review of ancient methods of painting with a consideration of their possibilities for contemporary use. Egg tempera, varnish tempera, under-painting, and oil glazes. Laboratory practice and lectures.

654. History of Renaissance Art. Five credit hours. Spring Quarter. Five lectures each week. Mr. Fanning.

The study of the Renaissance movement in Italy as reflected in architecture, painting, and sculpture; its influence upon other countries and its relationship to the intellectual trend from the fifteenth to the nineteenth century.

***656. History of Oriental Art.** Five credit hours. Winter Quarter. Five lectures each week. Mr. Fanning.

The study of Asiatic culture expressed by the historical development of architecture, sculpture, and painting in Persia, India, China, and Japan. Illustrated lectures, reading, and reports.

661-662-663. Advanced Technical Problems. Three to five credit hours. Enrollment in these numbers may be continued up to a total of fifteen hours each. Autumn, Winter, and Spring Quarters. This course is open, by permission of the department, to students who show particular ability and who, having completed the other technical courses offered in the department, wish to pursue advanced problems in specialized work.

(a) Water color painting. Miss Bradley, Mr. Rannells.
(b) Oil painting. Mr. Grimes, Mr. Hopkins.
(c) Life drawing. Mr. Gatrell, Mr. Sherman.
(d) Sculpture. Mr. Frey.
(e) Ceramics. Mr. Baggs.
(f) Design. Mr. Anderla, Mr. Rannells, Miss Bradley.

670. History of the Art of Ancient Egypt and Mesopotamia. Two credit hours. Autumn Quarter. Mr. Fanning.

The specialized study of the ancient arts of the valleys of the Nile and Tigris-Euphrates and their influence upon eastern Mediterranean culture. Lectures, discussions, and presentation by each student of some special problem of research.

671. History of Hellenic Art. Three credit hours. Autumn Quarter. Mr. Fanning.

The specialized study of Greek architecture, sculpture, and painting. Lectures, round table discussions and presentation by each student of some special problem of research.

672. History of Islamic Art. Two credit hours. Winter Quarter. Alternating with Fine Arts 674. Mr. Fanning.

The study of Moslem architecture and minor arts with special attention to origins and influences. Lectures, reading, and reports.

673. History of Christian Art of the Middle Ages. Three credit hours. Winter Quarter. Mr. Fanning.

The specialized study of various phases of Romanesque and Gothic art as an expression of medieval Christianity in Italy, France, Germany, Spain, and England. Lectures, reading, discussions, and reports on research topics.

***674. History of Spanish Art.** Two credit hours. Winter Quarter. Alternating with Fine Arts 672. Mr. Fanning.

The study of the architecture, sculpture, painting, and minor arts of Spain and the countries under Spanish influence. Lectures and reports.

***677. History of French Art from the Beginning of the Seventeenth Century to the Present Day.** Three credit hours. Spring Quarter. Reading knowledge of French desirable. Mr. Roos.

A specialized study of the architecture, sculpture, and painting of modern France. Illustrated lectures, reading, and reports.

* Not given in 1940-1941.

680. History of Art in Germany and the Low Countries. Three credit hours. Spring Quarter. Reading knowledge of German desirable. Mr. Anderla.

A specialized study of the architecture, sculpture, and paintings of the Germanic people and their relationship to social and political development. Lectures, reading, and reports.

Not open to students who have credit for Fine Arts 678 or 679.

681. History of English Art. Two credit hours. Winter Quarter. Mr. Roos.

A study of the work of outstanding architects, painters, and sculptors in England as an index of the artistic trend since the beginning of the sixteenth century. Illustrated lectures, reading, and reports.

Not open to students who have credit for Fine Arts 676.

682. History of American Art. Three credit hours. Winter Quarter. Mr. Roos.

A study of architecture, painting, and sculpture in America during the eighteenth, nineteenth, and twentieth centuries. Illustrated lectures, reading, and reports.

Not open to students who have credit for Fine Arts 676.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

801-802-803. Major Technical Problems. Three to five credit hours. Enrollments in these numbers may be continued up to a total of fifteen hours each. Autumn, Winter, and Spring Quarters. Mr. Hopkins, Mr. Fanning, Mr. Frey, Mr. Grimes, Mr. Baggs.

This course is open, by permission of the department, to graduate students who are qualified to do original work in ceramics, painting, or sculpture.

804-805-806. Major Historical Problems. Three to five credit hours. Enrollments in these numbers may be continued up to a total of fifteen hours each. Autumn, Winter, and Spring Quarters. Mr. Fanning, Mr. Baggs, Mr. Roos.

This course is open, by permission of the department, to graduate students who are qualified to do original research in the history of fine arts.

950. Research in Fine Arts. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work. Mr. Hopkins, Mr. Baggs, Mr. Fanning, Mr. Frey, Mr. Roos.

FRENCH

(See Romance Languages and Literatures)

GEOGRAPHY

Office, 416 Commerce Building

PROFESSORS SMITH, HUNTINGTON, VAN CLEEF, PEATTIE, AND CARLSON, ASSISTANT PROFESSOR WRIGHT, MR. McBRYDE, MR. McCUNE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

603. The Localization of Manufacturing Industries of the United States. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography or in economics. Mr. Wright.

The geography of American manufacturing. Industrial districts. Special study of representative industries as to: labor supply; sources, quantity, and value of material and power used; transportation facilities available; quantity and value of products; and problems of competition and markets.

604. Conservation and Land Utilization. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography or fifteen hours of allied subjects. Mr. Huntington.

The importance of our natural resources. The need for their conservation. Land as a natural resource and economic factor. Character and location as factors in land utilization and value. Regional and national planning for resource utilization.

605. Geography of Ohio. Two credit hours. Winter Quarter. Two class meetings each week. General prerequisites must include elementary courses in geography or fifteen hours of allied subjects. Mr. Huntington.

Geographic influences in the history of the state. Ohio's agriculture, industries, and social conditions, together with the underlying physical, climatic, and other environmental factors that have contributed to the present development of the region.

†611. Cartography and Map Interpretation. Three credit hours. Winter Quarter. Three class meetings each week. Given in alternate years. General prerequisites must include elementary courses in geography or ten hours of allied subjects. Mr. Smith.

The interpretation and appreciation of maps. A consideration of scales, symbols, and the common map projections. The representation of geographic data by the use of dots, isopleths, cartograms, and other graphic devices. A survey of the various maps published by the United States and other map-issuing institutions.

Not open to students who have credit for Geography 421.

615. Climatology. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include twenty hours in natural or social science, including geography, meteorology, or botany. Mr. Smith.

Elements of climate and their distribution. The controls of climate. Types of climate and their distribution, concluded by a consideration of the recent thought on the subject of climatic regions.

621. Geography of Europe. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Van Cleef.

The geographic factor in the economic, social, and political progress of the nations. Current major problems of the continent in the light of their geographic background.

624. Geography of Latin America. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Carlson.

Geographic regions of Mexico, Central America, the West Indies, and South America. The development of the political divisions in relation to their geographic conditions. Special emphasis is placed on the geographic analysis of Inter-American affairs.

625. Geography of Asia. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. McCune.

The major geographic regions of the continent and its insular fringe, with emphasis upon the regions of densest population. Consideration is given to interregional relationships.

631. The Historical Geography of Commerce. Three credit hours. One Quarter. Autumn and Spring. Three class meetings each week. General prerequisites must include elementary courses in geography or in history. Mr. Peattie.

Geographic factors in commerce to 1800. Resources and production in the ancient and medieval world. Trade routes in relation to exchange of ideas. Geographic elements in the early origin of many present-day commercial practices.

633. The Geography of Modern Commerce. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Carlson.

Geographic factors affecting the establishment and development of modern trade routes over air, land, and water. Unequal distribution of natural resources and differences in industrial and social development as basic factors in inter-regional and international trade. Geography in market analysis.

† Not given during the academic year, 1940-1941.

634. The Geography of Trade Centers. Three credit hours. One Quarter. Winter and Spring. Three class meetings each week. General prerequisites must include elementary courses in geography. Mr. Van Cleef.

Geographic factors in the origin and growth of urban centers. Analysis and synthesis of the economic and physical structure and functions of trade centers in the light of their geographic setting; areal expansion; intra- and inter-trade center relations; integration with avenues of communication; occasional field trips.

651. Anthropogeography. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include courses in elementary geography or history. Mr. Peattie.

Advanced social geography. The geographic factor in cultural evolution. A course giving attention to the individual interests of students in geography, education, history, and sociology.

700. Field Work in Geography. Two credit hours. Spring Quarter. General prerequisites must include twelve hours of geography. Mr. Smith, Mr. McBryde.

A course in the practice of field observation and geographic mapping.

750. Proseminar in Foreign Commerce. Two or three credit hours. Spring Quarter. One two-hour class period each week. Occasional field trips. Mr. Van Cleef.

Consideration of the leading contributors, and their philosophies, to the development of the foreign commerce of the United States; a summary discussion of the fundamentals underlying applied foreign commerce; field work involving the class as a group and independently by individual members; a review of current literature.

799. Special Problems in Geography. Two to five credit hours. Autumn, Winter, and Spring Quarters. Assigned readings, conferences, and reports. General prerequisites must include eighteen hours of geography and consent of the instructor must be obtained.

(a) Problems in Physical Geography. Mr. Peattie, Mr. Carlson, Mr. Smith.
(b) Problems in Climatology. Mr. Smith, Mr. Peattie.
(c) Problems in Political and Historical Geography. Mr. Huntington, Mr. Peattie, Mr. Van Cleef.
(d) Problems in Economic and Commercial Geography. Mr. Huntington, Mr. Van Cleef, Mr. Carlson, Mr. Wright.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

811. History of Geography. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include eighteen hours of geography. Mr. Van Cleef, Mr. Peattie.

Readings in the classics. The history of the development of geographic theories. Modern tendencies as seen in current literature.

850. Seminar in Geography. Two credit hours. Not more than two seminars to be given each Quarter. Subject to be announced each Quarter.

950. Research in Geography. Autumn, Winter, and Spring Quarters.

Research work in historical and political geography will be conducted under the direction of Mr. Huntington and Mr. Peattie; in geography of conservation and land utilization under the direction of Mr. Huntington and Mr. Carlson; in physical geography and climatology under the direction of Mr. Peattie and Mr. Smith; in commercial and urban geography under the direction of Mr. Huntington and Mr. Van Cleef.

Conference, assigned problems, and reports.

GEOLOGY†

Offices, 103, 104 Orton Hall

PROFESSORS CARMAN AND SPIEKER, ASSOCIATE PROFESSORS STOCKDALE AND STEWART, ASSISTANT PROFESSOR COLE, MR. STOUT, MR. FREEMAN, MR. LAMEY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Advanced General Geology: Physiography. Five credit hours. Autumn Quarter. Four class meetings and one two-hour laboratory period each week. Saturday mornings must be kept open for field trips. General prerequisites must include elementary courses in geology or geography. Mr. Cole.

A detailed study of the processes at work on the land surface and the topographic forms produced by them. This course includes practice in the interpretation of topographic maps.

602. Advanced General Geology: Structural and Dynamic. Five credit hours. Winter Quarter. Four class meetings and one two-hour laboratory period each week. General prerequisites must include Geology 601. Mr. Spieker.

A detailed study of the structural features of the earth's crust and of the forces which have produced these structures. This course includes practice in the interpretation of geological maps and in various measurements and computations.

603. Advanced General Geology: Historical. Five credit hours. Spring Quarter. Four class meetings and one two-hour laboratory period each week. Saturday mornings must be kept open for field trips. General prerequisites must include Geology 602. Mr. Carman, Miss Stewart.

A study of the geological history of North America, its physical history, and life development. The course deals with the classification and distribution of the geological formations, especially those of Ohio, and with the characteristic fossils of each system.

605. Economic Geology: Metals. Five credit hours. Autumn Quarter. Five class meetings or lectures each week. General prerequisites must include elementary courses in mineralogy. Mr. Freeman.

A study of the nature of ores, their classification and origin; the metallic deposits.

606. Economic Geology: Non-Metals and Coals. Three credit hours. Winter Quarter. Three class meetings or lectures each week. General prerequisites must include elementary courses in mineralogy. Mr. Freeman.

A study of non-metallic materials except petroleum. Origin, properties, classification, and distribution of the industrial minerals and rocks, and coal, with special emphasis on the coals of Ohio.

607. Economic Geology: Petroleum. Five credit hours. Spring Quarter. Four class meetings and one two-hour laboratory period each week. General prerequisites must include four Quarters of geology or of geology and mineralogy. Mr. Freeman.

A study of the origin, geologic occurrence, and distribution of petroleum, natural gas, and the solid bitumens.

*608. Stratigraphic Geology of Ohio. Five credit hours. Autumn Quarter. Given in alternate years. Permission of the instructor must be obtained. Mr. Carman.

Field trips with reports, lectures, and assigned readings. Field trips on Saturdays (entire day) while the weather permits.

The geological formations of Ohio are studied in the field, by rock specimens, and by assigned readings. This course is intended to acquaint the student with the rock formations of Ohio.

*609. Petrology. Five credit hours. Winter Quarter. Five class meetings and one two-hour laboratory period each week. Given in alternate years. General prerequisites must include elementary courses in mineralogy. Mr. Lamey.

A study of the occurrence, association, chemical relationships, and distribution of rocks, with laboratory study in rock identification.

* Not given in 1940-1941.

† For courses in mineralogy and petrography see the Department of Mineralogy.

610. Physiography of the United States. Five credit hours. Winter Quarter. Five class meetings each week. Given in alternate years. General prerequisites must include Geology 601. Mr. Cole.

A study of the physiographic regions of the United States. The topographic form and physiographic history with the geologic history as a background. Designed to give the student of geology or geography a working knowledge of the physiography of the United States.

612. Special Problems. Three to five credit hours. All Quarters. Assigned readings, conferences, and reports.

A study of special topics by conferences and reports. Laboratory, library or field work. Properly qualified students may carry on work in stratigraphy, sedimentation, structural geology, economic geology, petrology, opaque ore mineral studies, paleontology and physiography under the direction of the appropriate members of the department.

613. Glacial Geology. Three credit hours. Autumn Quarter. Certain Saturdays must be kept open for field trips. General prerequisites must include elementary courses in geology and preferably Geology 601. Mr. Cole.

A study of the glacial geology of North America, with special emphasis on the glacial problems of Ohio.

615. Geological Surveying. Five credit hours. Spring Quarter. Three class meetings and two field or laboratory periods each week. Given in alternate years. Permission of the instructor must be obtained. Class limited to ten. Mr. Stockdale.

A study of the construction and interpretation of topographic and geologic maps, with special emphasis on instrument work and map making. Field practice in various methods of triangulation, traversing, and topographic sketching. Instruments used include plane table, telescopic alidade, open sight alidade, aneroid barometer, paulin altimeter, hand level, stadia, and compass.

616. Clays. Five credit hours. Winter Quarter. Five class meetings each week. General prerequisites must include a course in chemistry. Mr. Stout.

The properties, distribution, uses, and origin of clays. Emphasis will be given to the clays of Ohio.

620. Introductory Paleontology. Three credit hours. Autumn Quarter. Two class meetings and one two-hour laboratory period each week. General prerequisites must include a course in historical geology. Mr. Carman, Miss Stewart.

A study of the systematic classification of the animal kingdom as a means of becoming acquainted with the faunas that characterize the various geological formations. The course deals mainly with the generic characters of the fossil invertebrates and their use in identifying and correlating geological formations.

621. Introductory Paleontology. Three credit hours. Winter Quarter. Mr. Carman, Miss Stewart.

A continuation of Geology 620.

622. Introductory Paleontology. Three credit hours. Spring Quarter. Mr. Carman, Mr. Wells.

A continuation of Geology 621 but this course deals largely with the fossil vertebrates.

***623. Micro-Paleontology.** Three credit hours. Spring Quarter. Laboratory work. Given in alternate years. General prerequisites must include Geology 620-621-622. Miss Stewart, Mr. Cole.

A study of fossil microorganisms, especially the foraminifera. The course is designed to give a general knowledge of the structure, habits, taxonomic relationships, and phylogenetic development of these organisms. Methods of study commonly practiced in commercial laboratories, and the use of microorganisms in determining geologic correlation, especially in oil drillings, are stressed in the laboratory work.

627. Field Geology. Eight credit hours. Summer Quarter. First term. General prerequisites must include Geology 601-602-603 or equivalent. Permission of the instructor must be obtained. Limited to men. Mr. Stockdale.

This course offers training in the standard methods of geologic field work. It is conducted from a fixed field camp at Cumberland Spring, near Dayton, Tennessee, and employs the entire time of the students. The field for study is the Appalachian region of eastern Tennessee, which offers considerable variety in physiographic, stratigraphic, structural, and economic geol-

* Not given in 1940-1941.

ogy. The course begins about June 15 and continues five weeks, after which a report will be prepared by each student and submitted by the following December first.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

If the student intends to specialize in paleontology he must have had in addition courses in zoology; if in inorganic geology, courses in chemistry, physics and mineralogy; if in physiography, courses in physics and chemistry.

801-802-803. Advanced Historical Geology. Three credit hours. Autumn, Winter, and Spring Quarters. Three lectures each week. Mr. Carman, Mr. Spieker.

A study of the physical history of the North American continent and of the life development which has taken place upon it. The lithology, subdivisions, geographical distribution, and fossils of each system are studied and from these the geological history of the time is interpreted.

807. Advanced Paleontology. Three or four credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include Geology 620, 621, and 622. Miss Stewart, Mr. Carman.

The identification and study of typical faunas from various geologic formations, with particular reference to those of Ohio. The work is individual and conducted as a laboratory course with conferences with the instructor in charge.

***810 Geology of the Eastern United States.** Three credit hours. Winter Quarter. Lectures, readings, conferences. General prerequisites must include acceptable courses in historical and structural geology. Mr. Carman.

A review of the important stratigraphic and structural features of the Eastern United States. Special attention is given to the correlation of the important formations, the major structures and the paleogeography of the region.

***811. Geology of the Western United States.** Three credit hours. Spring Quarter. Lectures, readings, conferences. General prerequisites must include acceptable courses in historical and structural geology. Mr. Spieker.

A review of the important stratigraphic and structural features of the Western United States, as exemplified by the Cordilleran region. Special attention is given to the correlation of the important formations, the major structures, and the paleogeography.

***812. Principles of Sedimentation and Stratigraphy.** Five credit hours. Spring Quarter. General prerequisites must include courses in advanced general geology. Four lectures and one conference each week. Mr. Spieker.

The origin, constitution, and relationships of stratified rocks; an approach to the outstanding problems of stratigraphy, in which attention is given chiefly to processes of sedimentation and their results, the interpretative study of sedimentary rocks, and the general problems of correlation.

Not open to students who have credit for Geology 618.

815. Seminar in Metamorphism. Two credit hours. Autumn Quarter. General prerequisites must include Geology 609. Mr. Freeman.

A study of the processes of metamorphism, with a critical analysis of the rock types produced.

816. Seminar in Structural Geology. Two credit hours. Winter Quarter. Mr. Spieker.

Conferences for the discussion of problems in geologic structure as exemplified and developed in selected mountain regions.

817. Seminar in Earth Tectonics. Two credit hours. Spring Quarter. Mr. Spieker.

Conferences covering the broader and more fundamental problems of earth structure, involving chiefly the nature and origin of crustal forces.

950. Research in Geology. Autumn, Winter, and Spring Quarters. Field, laboratory and library study. General prerequisites must include acceptable courses in the field chosen. Consent of the instructor must be obtained.

Research in stratigraphy and structural geology is conducted under the supervision of Mr.

* Not given in 1940-1941.

Carman, Mr. Spieker, and Mr. Stockdale; in paleontology under Mr. Carman and Miss Stewart; in sedimentation under Mr. Spieker; in economic geology and petrology under Mr. Freeman and Mr. Lamey; and in physiography under Mr. Cole.

GERMAN

Office, 213 Derby Hall

PROFESSORS EVANS, EISENLOHR (EMERITUS), MAHR, AND SPERBER, ASSOCIATE PROFESSOR GAUSEWITZ, ASSISTANT PROFESSORS THOMAS (EMERITUS), NORDSIECK, AND KRAMER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601-602-603. Survey of German Literature. Two credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include graduate standing or the successful completion of at least two courses in the "600" group. Mr. Nordsieck.

This course is intended primarily to afford first-year graduate students an opportunity for wide reading in the general field of German literature or for intensive reading in specific periods. Informal discussion and written reports.

Proseminar: Eighteenth and Nineteenth Century Literature. Three credit hours. Autumn, Winter, and Spring Quarters. Three hours lecture and quiz each week. General prerequisites must include six Quarters of German or equivalent. The courses are presented below in a three-year cycle.

1940-1941:

614. Autumn Quarter, 1940. Goethe's Prose. Mr. Evans.

629. Winter Quarter, 1941. Gottfried Keller. Mr. Gausewitz.

642. Spring Quarter, 1941. Thomas Mann. Mr. Mahr.

1941-1942:

608. Autumn Quarter, 1941. Lessing. Mr. Mahr.

622. Winter Quarter, 1942. Schiller. Mr. Evans.

623. Spring Quarter, 1942. Kleist. Mr. Gausewitz.

1942-1943:

632. Autumn Quarter, 1942. Hebbel. Mr. Mahr.

612. Winter Quarter, 1943. Goethe's Faust. Mr. Evans.

641. Spring Quarter, 1943. Hauptmann. Mr. Gausewitz.

656. Introduction to the Historical Study of German. Three credit hours. Autumn Quarter. Three hours lecture and drill each week. General prerequisites must include six Quarters of German or equivalent. Mr. Sperber.

Elements of phonetics. Relations between German and English phonology. Survey of the history of the German language.

673. Elementary Middle High German. Three credit hours. Winter Quarter. Mr. Sperber.

Introduction to the study of Middle High German with the reading of easy texts.

675. Elements of Semantics. Three credit hours. Spring Quarter. Three hours lecture and quiz each week. Mr. Sperber.

Studies in German words and the development of their meaning.

685. Advanced Composition. Three credit hours. Spring Quarter. Three hours lecture and quiz each week. General prerequisites must include acceptable courses in German composition. Mr. Kramer.

An advanced course in speaking and writing German, accompanied by a review of German syntax.

691. Practical German Pronunciation. Two credit hours. Autumn Quarter. Two hours lecture and drill each week. General prerequisites must include six Quarters of German or equivalent. Mr. Kramer.

The formation of German sounds. A systematic study of the standard of German pronunciation and its chief variations. Oral and written drill. For majors, especially those who expect to teach the language.

695. Special Problems. Two to ten credit hours. Autumn, Winter, and Spring Quarters. Mr. Evans, Mr. Mahr, Mr. Gausewitz.

Investigations of minor problems in the various fields of German literature and philology.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 690.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Candidates for the doctorate with German as a major field must present a knowledge of a Romance Language which is the equivalent of at least two courses in the "600" group or a working knowledge of either Latin or Greek.

***801. Advanced Middle High German.** Three credit hours. Autumn Quarter. Mr. Sperber.

The reading of more difficult Middle High German texts. Methods of textual criticism.

***805. Gothic.** Three credit hours. Winter Quarter. Mr. Sperber.

***810. Old High German.** Three credit hours. Spring Quarter. Mr. Sperber.

860. Seminar in German Literature. Five credit hours. Autumn, Winter, and Spring Quarters. The courses are presented below in a three-year cycle.

1940-1941:

Autumn Quarter. The German Novelle. Mr. Gausewitz.

Winter Quarter. History of the Novel. Mr. Mahr.

Spring Quarter. German Literature in the Sixteenth and Seventeenth Centuries. Mr. Evans.

1941-1942:

Autumn Quarter. Drama of the Classical Period and Romanticism. Mr. Gausewitz.

Winter Quarter. Drama of the Nineteenth Century. Mr. Mahr.

Spring Quarter. Medieval Drama. Mr. Evans.

1942-1943:

Autumn Quarter. Studies in German Dramatic Theory from the Renaissance to Classicism. Mr. Evans.

Winter Quarter. Studies in German Dramatic Theory from Romanticism to Poetic Realism. Mr. Gausewitz.

Spring Quarter. Studies in German Dramatic Theory from Naturalism to the Present Day. Mr. Mahr.

870. Seminar in German Linguistics. Three credit hours. Autumn, Winter, and Spring Quarters. Mr. Sperber.

Ausgewählte Gegenstände aus den Gebieten der Wortgeschichte, der Stilforschung und der Sprachpsychologie.

950. Research in German. Autumn, Winter, and Spring Quarters. Mr. Evans, Mr. Eisenlohr, Mr. Mahr, Mr. Gausewitz.

GREEK LANGUAGE AND LITERATURE

(See Classical Languages and Literature)

* Not given in 1940-1941.

HISTORY

Office, 211 University Hall

PROFESSORS WASHBURNE, SIEBERT (EMERITUS), McNEAL, HOCKETT, HILL, DORN, McDONALD, AND WOODRING, ASSOCIATE PROFESSORS ROSEBOOM, WEISENBURGER, AND SIMMS, ASSISTANT PROFESSOR GRIMM

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include at least four Quarters in the social science field, of which at least two must be in history.

See page 50 for the program in Ancient History and Literature.

***607. The Renaissance.** Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Dorn.

The Renaissance primarily as an Italian movement. The political evolution of the Italian communes into city republics, with special emphasis on Florence, Milan, Venice, Genoa, and Rome; early capitalism and industrial and commercial movements; an analysis of the culture, art, science, and literature of the Renaissance and their influence upon the Church, the Papacy, and modern modes of thought and behavior. Lectures, readings, reports, and discussions.

608. The Reformation. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Dorn.

The Church and European society in the later Middle Ages; culture and thought in the age of the Reformation; the rise of the European state system; Luther and the German National movement; Zwingli and Switzerland; Calvin; the expansion of Protestantism in Europe; and the relation of the Reformation to medieval and modern civilization. Lectures, readings, reports, and discussions.

611. Constitutional History of England (to 1485). Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include History 682 or consent of the instructor. Mr. Woodring.

The development of an effective royal administration, rise of common law and system of courts, dawn of representative institutions, completion of basic institutions and tradition of constitution by 1485. Lectures, textbook, source problems, collateral readings.

612. Constitutional History of England (since 1485). Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include History 611 or consent of the instructor. Mr. Woodring.

The Tudor system, the struggle between king and parliament, cabinet government, electoral reform, and the law of the modern constitution. Lectures, textbook, source problems, collateral readings.

617. The Absolute Monarchy (1650-1789). Three credit hours. Spring Quarter. Three class meetings each week. Mr. Dorn.

This course offers a study of the transformation of feudal society into the modern absolute state in its social, economic and constitutional aspects, as exemplified in France, Spain, Austria, Prussia, and Russia. Special emphasis will be placed on France under Louis XIV, on the evolution of Prussia and Russia, the changing diplomatic alignments of the principal European Powers from 1660 to 1789, on the intellectual enlightenment of the eighteenth century and Enlightened Despotism. Readings, discussions, and reports.

619. Medieval Civilization. Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments without this prerequisite admitted only with consent of the instructor. Mr. McNeal.

The formation of feudal society; culture of castle and court; the rise of towns and their social and economic life; the evolution of the Medieval Church and its educational and artistic contributions. Lectures, readings, problems, and class discussion.

621. Expansion of Europe (to 1588). Three credit hours. Autumn Quarter. Three class meetings each week. Advanced students from other departments admitted only with the consent of the instructor. Mr. Washburne.

A study of the early geographical ideas of the Europeans, their first contact with the outside world, the period of discovery, the creation of the Portuguese empire in the east and the Spanish monopoly in the west, to the collapse of the Iberian control of European expansion by the destruction of the Armada in 1588. Lectures, readings, and discussions.

* Not given in 1940-1941.

622. Expansion of Europe (1588 to 1815). Three credit hours. Winter Quarter. Three class meetings each week. Advanced students from other departments admitted only with the consent of the instructor. Mr. Washburne.

A study of the rise of the chartered trade companies, the ascendency of the Dutch, the contest between the Dutch and the English for commercial supremacy and the long struggle between the English and the French for maritime supremacy, with its resultant effects upon India and North America through the settlement at the end of the Napoleonic era. Lectures, readings, and discussions.

623. Expansion of Europe (1815 to the Present). Three credit hours. Spring Quarter. Three class meetings each week. Advanced students from other departments admitted only with the consent of the instructor. Mr. Washburne.

A study of the problems of expansion in the nineteenth and twentieth centuries; the development of India; the movement into the Southern Pacific; the partition of Africa and the various phases of modern imperialism after 1876, through the readjustment of territory under the mandate system after the World War. Lectures, readings, and discussions.

624. The French Revolution and Napoleon. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments admitted only with the consent of the instructor. Mr. McNeal.

625. Modern France (since 1815). Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments admitted only with the consent of the instructor. Mr. McNeal.

†626. The Near Eastern Question (1815 to the Present). Three credit hours.

A study of the conflicting national and international problems which resulted in the disintegration of the Ottoman Empire, the formation of the Balkan States and the development of the present Turkish national government with its role in European affairs. Lectures, readings, discussion.

629. Modern Germany (1789-1918). Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include elementary history courses. Advanced students from other departments without these prerequisites must obtain the consent of the instructor. Mr. Dorn.

Introductory lectures on the basic problems and tendencies of German history; Germany and the French Revolution; German Enlightenment and Romanticism and their relation to political thought; the Stein-Hardenberg reforms and the war of liberation; Prussia, Austria and the problem of German unity; the nationalist and democratic movements; the Bismarckian Empire; industrial development; William II and the World War; the German Revolution of 1918. Lectures, readings, reports, and discussions.

630. The Diplomacy of Europe (1878-1919). Three credit hours. Autumn Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments admitted only with the consent of the instructor. Mr. Washburne.

A study with the use of the new material now available, of the diplomatic obligations of the European states from the Congress of Berlin of 1878 to the Paris Conference of 1919; the formation of alliances, the crises which culminated in the war, and the attitude of European leaders. Lectures, readings, and discussions.

631. Constitutional History of the United States (to 1815). Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hockett.

The purpose of this course and the others in this sequence is to exhibit our constitutional system as a growth resulting from the actual experiences of our people. The first Quarter deals with the antecedents of the Constitution, the work of the Federal Convention of 1787, and the problems encountered in carrying on government under the Constitution, to the close of the War of 1812.

***632. Constitutional History (1815-1876).** Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hockett.

A continuation of History 631, covering the reaction which led to the nullification episode and the Civil War and ending with a consideration of the problems of reconstruction.

† Not given during the academic year, 1940-1941.
* Not given in 1940-1941.

633. The Slavery Controversy in the United States. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Simms.

The origins of the institution of slavery; the social system of the old South; the psychological, economic, political, and constitutional implications of the controversy; secession, and the appeal to arms. Lectures, readings, and discussions.

634. Reconstruction and the New South (1863-1938). Three credit hours. Winter Quarter. Three class meetings each week. Mr. Simms.

The controversy over reconstruction plans; the triumph of the industrial order; the social and economic readjustments in the Southern States during and after the period of reconstruction. Lectures, readings, and discussions.

635. American Diplomacy to the Close of the Civil War. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hill.

The foreign relations of the United States, beginning with the diplomacy which resulted in the establishment of independence and including such subjects as the struggle for neutral rights and commercial recognition, the extension of territory on the continent, the origin of the Monroe Doctrine, and the international controversies of the Civil War. Lectures, discussions, and reports.

636. American Diplomacy since the Civil War. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hill.

Problems in the diplomacy of the United States resulting from the Civil War, the development of the Monroe Doctrine, the acquisition of dependencies, relations with Latin America and the Orient, arbitration, the Isthmian Canal, and neutral rights during the Great War in Europe. Lectures, discussions, and reports.

637. Recent History of the United States (1875-1913). Three credit hours. Autumn Quarter. Three class meetings each week.

A study by the topical method of political, economic, social, and constitutional problems, with a special attempt at interpretation. Lectures, textbook, and collateral readings.

638. Recent History of the United States (since 1913). Three credit hours. Winter Quarter. Three class meetings each week.

This course is the logical continuation of History 637 but may be taken separately. The method of presentation and the general topics treated are the same as for History 637. Lectures, textbook, and collateral readings.

639. The Influence of Immigrant Groups upon United States History. Five credit hours. Spring Quarter. Five class meetings each week. Mr. Weisenburger.

The share of different immigrant groups in the building of the nation, from the colonial period to the present; with special emphasis on the influence of immigration upon American political, economic, social, and cultural development. Lectures, readings, and discussions.

640. The Frontier in the Making of America (to 1840). Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Hockett.

This course, together with History 641, follows the expansion of settlement westward from the Atlantic coast, picturing the life of the pioneers and the rise of new communities, and tracing their influence upon national development. Lectures, discussions and reports.

†641. The Frontier in the Making of America (since 1840). Three credit hours. Spring Quarter. Three class meetings each week. Mr. Hockett.

A continuation of History 640.

643. Political Parties in the United States. Five credit hours. Spring Quarter. Five class meetings each week. Mr. Roseboom.

The radical party of the Revolution; the origin and growth of national parties; the slavery issue in party politics; the effect of the Civil War upon parties; party development in recent American history, special attention being devoted to the influence of the new economic and social conditions in creating new parties and policies. Lectures, readings, discussions, and reports.

644. The Colonization of North America. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Roseboom.

A survey of the transplanting of European culture and institutions to North America. Colonizing methods of the leading colonial powers will be considered as well as the expansion of their colonies and the resulting international struggle for supremacy, with special emphasis upon English colonization and institutional development. Lectures, readings, reports, and discussions.

† Not given during the academic year, 1940-1941.

645. Latin America. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Hill.

The European background; native cultures of the New World; conquest and settlement; political, social, and economic institutions; the wars for independence. This course affords a natural introduction to History 646. Lectures, readings, and discussions.

646. Latin America. Five credit hours. Spring Quarter. Five class meetings each week. Mr. Hill.

The evolution of the A B C powers and Mexico, with minor consideration of the other republics; major problems of an inter-American and an international nature. This course is a logical continuation of History 645. Lectures, readings, and discussions.

647. History of Canada. Five credit hours. Spring Quarter. Five class meetings each week. Mr. Weisenburger.

An intensive study of Canadian history with special emphasis on the relations of Canada with the United States and with the mother country, and the comparison of Canadian institutions and problems with our own. Lectures, textbook, collateral readings, and discussions.

649. Greek Civilization. Three credit hours. Winter Quarter. Three class meetings each week. Mr. McDonald.

A study of the contributions of Greece to Western civilization; political institutions, law, religion, drama, literature, science, and philosophy. Lectures, readings, and discussions.

650. Roman Civilization. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. McDonald.

A study of Roman contributions to Western civilization; political institutions, Roman law, religions in the Roman Empire with special reference to Christianity, slavery, agriculture, economic life, etc. Lectures, readings, and discussions.

***653. The Ancient History of the Near East.** Three credit hours. Spring Quarter. Three class meetings each week. Mr. McDonald.

A survey of the history of Egypt, Sumer, Akkad, Babylon, and Assyria. Lectures, readings, and reports.

654. The Age of the Crusades. Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include a major in history. Advanced students from other departments admitted only with the permission of the instructor. Mr. McNeal.

Conditions in western Europe preceding the First Crusade, influence of the early crusading movement on the development of western Europe in the twelfth century, contemporary accounts of the Crusades. Readings, lectures, and reports on contemporary sources.

655. Greek History. Five credit hours. Autumn Quarter. Five class meetings each week. Mr. McDonald.

An intensive study of Greece, with a brief introductory survey of the ancient civilization of the Near East. Lectures, readings, reports, and discussions.

656. Roman History. Five credit hours. Winter Quarter. Five class meetings each week. Mr. McDonald.

This course is the natural continuation of History 655. Lectures, readings, reports, and discussions.

682. History of England, Medieval Period (to 1485). Three credit hours. Autumn Quarter. Three meetings each week. General prerequisites must include a course in the history of the Middle Ages or consent of the instructor. Mr. Woodring.

History 682, 683, 684 constitute an interdependent sequence in which the history of England and Greater Britain, socially considered, is rapidly surveyed from the earliest times to our own day. The aim of the course is to give a connected narrative, in terms of social, economic, and political conditioning, expressed in terms of historic personalities. Particularly, the necessary background for the student of English literature and of law, will be furnished. The student will be introduced to a wide range of books, both historical and literary. Graduate students will be required to synthesize their readings into a written report.

Not open to students who have credit for History 421.

683. History of England, Tudor and Stuart Periods (1485-1714). Three credit hours. Winter Quarter. Three meetings each week. General prerequisites must include History 682 or consent of the instructor. Mr. Woodring.

Not open to students who have credit for History 421 and 422.

* Not given in 1940-1941.

684. History of England, Hanoverian and Modern Period (since 1714). Three credit hours. Spring Quarter. Three meetings each week. General prerequisites must include History 683 or consent of the instructor. Mr. Woodring.

Not open to students who have credit for History 422.

685. Cultural and Social Eighteenth Century England. Three credit hours. Spring Quarter. Three class meetings each week. Given in alternate years. Mr. Woodring.

The society of the eighteenth century and the politics of George III, the background of the American Revolution and the struggle with revolutionary France in terms of the Industrial Revolution. Lectures, collateral readings, special investigations, and reports.

***686. Contemporary England.** Three credit hours. Spring Quarter. Three class meetings each week. Given in alternate years. Mr. Woodring.

Victorian England in its economic, political, and cultural phases transformed by imperialism, the Great War, and the rise of new class theory and organization. Lectures, readings, reports, informal discussions.

***688. Constitutional History of the United States (since 1876).** Three credit hours. Spring Quarter. Three class meetings each week. Mr. Hockett.

A continuation of History 632, covering the constitutional problems arising from capitalism, the organization of labor, territorial expansion, the World War, and the New Deal.

This course arranged in a cycle with History 631 and 632.

689. The History of Ohio. Three credit hours. Winter Quarter. Three class meetings each week. Mr. Weisenburger.

A general survey of the history of Ohio—social, economic, religious, and political—from the Indian period to the present time.

Not open to students who have credit for History 437.

690. Contemporary Europe (1919-1933). Three credit hours. Winter Quarter. Three class meetings each week. Mr. Washburne.

A study of present day problems. A consideration of the phases of the attempted reconstruction of Europe following the Paris Peace Conference of 1919. This includes the issues involved in the subjects of post war diplomacy, reparations, disarmament, the new governments of Europe and the continental development until the establishment of the dictatorship in Germany.

Not open to students who have credit for History 628.

691. Contemporary Europe (since 1933). Three credit hours. Spring Quarter. Three class meetings each week. Mr. Washburne.

A continuation of History 690 but may be taken separately. Consideration will be given to the re-armed Germany and its effect upon the affairs of the world, the failure of collective security in Manchuria, Ethiopia, and Spain, the formation of the new alignments and the breakdown of the treaty of Versailles with he settlement at Munich in 1938 and its consequences.

Not open to students who have credit for History 628.

700. Minor Problems in History. One to five credit hours. Summer, Autumn, Winter, and Spring Quarters. Open by permission of the instructor.

Th course consists of individual study in some field of historical development and is designed to allow the student to work upon a problem in which he is particularly interested. Special permission must be obtained to register for this course.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 678.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include acceptable foundation courses of collegiate grade in European and American history, economics and political science.

DEPARTMENTAL REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

A. Notice of Candidacy. Students who expect to become candidates for the degree of Doctor of Philosophy should make known their intentions not later than the beginning of the first Quarter of the second year of graduate work.

From the list below, each student will select and enter upon an application form which may be obtained from the office of the department, five fields of history and one field of allied knowledge. Three of the history fields must be selected from Group A and two from Group B

* Not given in 1940-1941.

or three may be selected from Group B and the other two from Group A. One of the fields of history shall be designated as the dissertation field. The sixth field must be selected from Group C.

B. Fields of Choice:

GROUP A

Ancient Near East and Greece
Roman History
Medieval History
Era of the Renaissance and Reformation
Era of the Absolute Monarchy and French Revolution
Europe since 1815
European Diplomacy since 1878
England to 1603
England and Greater Britain since 1603
Expansion of Europe

GROUP B

Colonial Era of the Western Hemisphere
Political and Social History of the United States through the Civil War
Political and Social History of the United States since the Civil War
Slavery Controversy and Post-Bellum South
Constitutional History of England and the United States
Greater Republics of Latin America
American Foreign Relations

GROUP C

An approved field in anthropology, economics, political science, philosophy, literature, or other allied subject

C. Foreign Languages. Except in special cases, a reading knowledge of French and German is required of every candidate for the degree of Doctor of Philosophy in history. In special cases, the department may consent to the substitution of another language for French or German. In such cases the language selected as a substitute must have a clear bearing upon the candidate's field of research.

D. The General Examination. The candidate will be required to take examinations in all five of the selected fields of history and in the allied field. All candidates for the degree of Doctor of Philosophy are required to have had History 812 or its equivalent, and are required to take History 813 and History 814, and at least four seminars in history, of which two must be in the field of European history and two in the field of American history.

Candidates for the Doctor of Philosophy degree in history should read the general requirements for this degree as given on page 36 of the bulletin of the Graduate School.

812. Introduction to Historical Research. Three credit hours. Autumn Quarter. Three class meetings each week. Required of candidates for the Master's degree. Mr. Hockett.

A practice course dealing with the problems involved in the preparation of the Master's thesis. Should be taken during the student's first Quarter in the Graduate School.

813. Great European Historians. Three credit hours. Winter Quarter. Required of candidates for the Doctor's degree. Mr. Dorn.

A study of the leading historical writers and schools of Europe, with selected readings from representative writers.

†814. Great American Historians. Three credit hours. Spring Quarter. Required of candidates for the Doctor's degree. Mr. Hockett.

A study of the leading American writers and schools of history.

815. Seminar in European History. Three credit hours. Autumn Quarter. History 812 must be included in the general prerequisites or taken concurrently. Mr. Washburne.

A practical course in research. Italy and the Triple Alliance.

816. Seminar in European History. Three credit hours. Winter Quarter. History 812 must be included in the general prerequisites or taken concurrently. Mr. Woodring, Mr. Dorn.

A practical course in research.

Problems: A. English Politics in the Period of the American Revolution. Mr. Woodring.
B. Modern Theories of History. Mr. Dorn.

817. Seminar in European History. Three credit hours. Spring Quarter. History 812 must be included in the general prerequisites or taken concurrently. Mr. McNeal.

A practice course in research.

† Not given during the academic year. 1940-1941.

819. Seminar in American History. Three credit hours. Autumn Quarter. History 812 must be included in the general prerequisites or taken concurrently. Mr. Hill.

A practice course in research. Problem: American Policy in the Pacific Area.

820. Seminar in American History. Three credit hours. Winter Quarter. History 812 must be included in the general prerequisites or taken concurrently. Mr. Simms.

A practice course in research.

821. Seminar in American History. Three credit hours. Spring Quarter. History 812 must be included in the general prerequisites or taken concurrently. Mr. Roseboom.

A practice course in research.

950. Research in History. Autumn, Winter, and Spring Quarters. Open by permission of the chairman of the department.

This course is to be used only for Master's thesis and Ph.D. dissertation work.

HISTORY OF EDUCATION

(See Education)

HOME ECONOMICS

Office, 220 Campbell Hall

PROFESSORS GORRELL AND McKAY, ASSOCIATE PROFESSORS LEHMAN AND MORGAN, ASSISTANT PROFESSORS KENNEDY, PRESSEY, TURNBULL, BANCROFT, DAISY DAVIS, HUGHES, RYAN, HEINER, PETZEL, AND SCOTT, MISS BIESTER, MISS GREEN

In cooperation with the University Hospital, an opportunity is given for dietitian internes to schedule a sequence leading to the Master's degree. Candidates for appointment as student internes should be graduates of the four-year course of a recognized Home Economics department with a major in foods and nutrition or institution management.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Clothing. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Three or five two-hour periods for class discussion and laboratory each week. General prerequisites must include an elementary course in clothing. Miss Ryan.

Application of principles of color, line, and texture to costume. Various types of fabrics are used in draping. Analysis of the factors which affect the utilization of clothing.

602. Textiles. Three or five credit hours. One Quarter. Autumn and Spring. Students who register for three credit hours will have two one-hour periods and one two-hour period each week. Students who register for five credit hours will have two two-hour periods in addition. Miss Petzel.

Students who register for three hours will make a study of the selection, use, and care of fabrics. Students who register for five hours will, in addition, make chemical and physical tests to determine probable serviceability of fabrics, and suitable methods of care.

†604. Clothing. Three credit hours. General prerequisites must include an elementary course in clothing, experience in teaching clothing or consent of instructor.

A course in clothing planned to meet the needs of teachers who wish to acquire a knowledge of the recent developments in this field.

611. Nutrition. Five credit hours. One Quarter. Autumn, Winter, Spring. Three meetings for class discussion and two two-hour laboratory periods each week. General prerequisites must include fundamental courses in physiology and agricultural chemistry. Miss McKay.

A study of the fundamental principles of human nutrition and their application to the feeding of individuals and groups under varying physiological and economic conditions.

† Not given during the academic year, 1940-1941.

612. Nutrition. Five credit hours. Spring Quarter. Three two-hour periods each week for class discussion and laboratory; other hours to be arranged. General prerequisites must include Home Economics 611. Miss McKay.

Experience in the use of current literature as a means of following the development of modern concepts of nutrition. Problems of feeding in connection with overweight, underweight, and other abnormal conditions in which diet is an important part of the treatment.

614. Foods. Three or five credit hours. One Quarter. Autumn and Winter. Students who register for five credit hours will have three meetings for discussion and two three-hour laboratory periods each week. Students who register for three hours will have two meetings for discussion and one three-hour laboratory period each week. Miss McKay, Miss Hughes, Mrs. Kennedy, Miss Green.

This course considers problems concerning the purchase of food and the planning and preparation of meals.

†615. Experimental Work in Food Preparation. Five credit hours. General prerequisites must include Home Economics 611 or consent of the instructor.

Application of experimental methods to problems involved in the preparation of foods.

†616. Nutrition of Infants and Children. Three credit hours. General prerequisites must include Home Economics 611 or consent of the instructor.

A study of the problems involved in the feeding of children. A review of the literature with laboratory work in planning diets. Observations will be made in the Home Economics Nursery School.

619. Household Equipment. Three credit hours. Autumn Quarter. Two hours for class discussion and one two-hour laboratory period each week. General prerequisites must include a course in household equipment. Miss Davis.

Application to home situations of the recent developments in lighting, with special emphasis on selection, care, and use of home lighting equipment.

620. Household Equipment. Five credit hours. Spring Quarter. One hour each week for discussion and two afternoons each week for laboratory and field work. General prerequisites must include Home Economics 619 and consent of the instructor. Miss Davis.

A study of the methods used in home service. Actual experience through cooperation of commercial firms and their home economists.

621. Child Development. Five credit hours. One Quarter. Autumn, Winter, Spring. Four meetings for class discussion each week; three morning hours to be arranged for laboratory. General prerequisites must include a course in psychology and Home Economics 611. Students not majoring in home economics may by consent of instructor substitute other courses for the home economics courses as prerequisites. Miss Morgan.

The nature, development, care, and training of the child, and the responsibility of society for providing for the physical, mental, and social needs of the child. The Home Economics Nursery School affords an opportunity for observation and for experience with children.

626. Principles of Home Management. Three credit hours. One Quarter. Autumn, Winter, Spring. Three periods each week for class discussion. General prerequisites must include Home Economics 611 and elementary courses in economics or consent of the instructor. Mrs. Gorrell, Miss Morgan, Miss Turnbull, and others.

A study of the management of the various resources available to the family, with a view to securing well-being and satisfaction for the members.

627. Laboratory in Home Management. Five credit hours. One Quarter. Autumn, Winter, Spring. One conference each week and laboratory to be arranged. Home Economics 626 must be included in the general prerequisites or taken concurrently. Miss Morgan and others.

An application of the principles presented in other courses. Each student is provided with an opportunity to study the management of one or more homes, the needs of the student being considered.

† Not given during the academic year, 1940-1941.

***628. Selection of Furnishings for the Home.** Three credit hours. Spring Quarter. Three periods each week for class discussion. Miss Heiner.

A study of the consumers' problems in the selection of home furnishings. Field work is arranged with retail merchants.

630. The Purchase of Foods for Institutions. Three credit hours. One Quarter. Autumn and Winter. One lecture and two two-hour laboratory periods each week. General prerequsites must include Home Economics 611, 614, and elementary courses in economics. Mrs. Kennedy.

A study of purchasing food on a large quantity basis. Marketing practices studied from the standpoint of buying for institutions.

631. Institution Cookery and Equipment. Five credit hours. One Quarter. Autumn and Winter. Hours for discussion and laboratory to be arranged. General prerequisites must include a course in engineering drawing. Home Economics 630 and 632 must be taken concurrently. Mrs. Kennedy.

Application of principles of cookery to large quantity preparation. A study of standardized formulas, calculation of food costs, the construction, operation and use of equipment, the writing of specifications, and the drawing of floor plans.

632. Institution Organization and Administration. Five credit hours. One Quarter. Autumn and Winter. Hours to be arranged. Home Economics 630 and 631 must be taken concurrently. Mrs. Kennedy.

A study of the principles of organization and management applied to the problems of housing and feeding institution groups. Supervised experience in club service and cafeteria management.

633. School Lunchroom Management. Three credit hours. Spring Quarter. One lecture and four laboratory hours each week. Home Economics 611 or a course in elements of nutrition must be included in the general prerequisites or taken concurrently, or consent of the instructor must be obtained. Mrs. Kennedy.

A general course for those desiring to be prepared to manage a school lunchroom in connection with their teaching.

***635. Foods.** Three credit hours. General prerequisites must include Home Economics 611 or consent of instructor. Miss Hughes.

This course considers the recent important contributions of research relative to the preparation and preservation of foods.

644. The Teaching of Home Economics. Three credit hours. Winter Quarter.

The influence of the newer movements in secondary education on home economics will be the center of the discussions. Consideration will be given to the place of home economics in the experimental secondary school programs and in such developments as integrated and unified educational offerings, core and fused courses, and to the setting up of special home economics courses from a functional point of view.

701. Special Problems in Home Economics. Three to fifteen credit hours for one Quarter or more. To be given in units of three or five hours. Autumn, Winter, Spring. One conference or more each week.

Problems in various phases of home economics chosen for individual study. Groups will be organized as follows:

(a) Problems in food preparation. Autumn and Winter Quarters. Miss Hughes.
(b) Problems in nutrition and dietetics. Autumn, Winter, Spring. Miss McKay.
(c) Problems in textiles. Autumn and Spring Quarters. Miss Petzel, Miss Turnbull.
(d) Problems in clothing. Autumn and Spring Quarters. Miss Ryan.
(e) Problems in home furnishing. Autumn, Winter, Spring. Miss Heiner.
(f) Problems in household equipment. Winter and Spring Quarters. Miss Davis.
(g) Problems in home management. Autumn, Winter, Spring. Mrs. Gorrell, Miss Biester.
(h) Problems in institution management, equipment, and food buying. Spring Quarter. Mrs. Kennedy.
(i) Problems in teaching home economics. Winter and Spring Quarters. Mrs. Pressey.
(j) Problems in child development. Autumn, Winter, Spring. Miss Morgan.

* Not given in 1940-1941.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

†802. **Seminar in Home Economics Teaching.** Three to five credit hours. Home Economics 644 must be included in the general prerequisites or taken concurrently. Consent of the instructor must be obtained. Mrs. Pressey.

A study of content, methods, and administration of home economics teaching.

803. **Seminar in Foods and Nutrition.** Three credit hours. Autumn Quarter. General prerequisites must include the consent of instructor. Miss McKay and others.

Conferences and reports on topics in foods and nutrition.

950. **Research in Home Economics.** Autumn, Winter, and Spring Quarters. Mrs. Gorrell, Miss McKay, Miss Lehman, Miss Morgan, Mrs. Pressey, Mrs. Kennedy, Miss Turnbull, Miss Davis, Miss Hughes, Miss Petzel.

Investigational work bearing upon the problems of living, either in the home, the institution or under commercial conditions.

HORTICULTURE AND FORESTRY
Office, 118 Horticulture and Forestry Building

PROFESSORS GOURLEY, PADDOCK (EMERITUS), BROWN, AND LAURIE, ASSOCIATE PROFESSORS CHADWICK AND HOWLETT, ASSISTANT PROFESSORS CHILDERS, BEYER, AND POESCH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include acceptable courses in pomology, vegetable gardening, floriculture and forestry.

601. **Horticultural Plant Breeding.** Three credit hours. Winter Quarter. Three recitations each week. Given in alternate years. Mr. Laurie, Mr. Brown.

A study of the methods of breeding of horticultural crops; the modification and improvement of plants under cultivation, together with a discussion of the theories of heredity.

602. **Experimental Horticulture.** Three credit hours. Autumn Quarter. Two lectures and five hours laboratory each week. Botany 605 must be included in the general prerequisites or taken concurrently. Mr. Howlett.

This course is designed to study primarily the physiological responses of horticultural plants that have been grown under varying environmental conditions. The emphasis will be placed upon the observation and examination of the plants themselves. Some of the subjects considered are: nitrogen deficiency, nitrate assimilation in horticultural plants, synthesis and reutilization of proteins, photoperiodism, water deficiency, carbohydrate deficiency, nitrogen-carbohydrate relationships, potassium, phosphorus, and calcium deficiency. In this connection the student will become acquainted with some current research methods in horticulture.

603. **Experimental Horticulture.** Three credit hours. Winter Quarter. Two lectures and four hours laboratory period each week. Botany 605 must be included in the general prerequisites or taken concurrently. Mr. Childers.

The course involves a study of photosynthesis, respiration, transpiration, translocation, and other physiological processes as related to the practical problems in pruning, propagation, spraying, fertilization, cultivation, harvesting, and storage of horticultural crops. Methods and equipment used in studying the processes, a critical analysis of outstanding horticultural contributions, statistical methods, and preparation of subject matter for publication, will be considered. The course is designed especially for students majoring in floriculture, pomology, and vegetable crops, but is open to students in other departments.

604. **Systematic Pomology.** Three credit hours. Autumn Quarter. Three two-hour conference periods each week. Given in alternate years. Mr. Childers.

Nomenclature, classification, and identification of fruits; detailed descriptions, botanical relationships, adaptations, and commercial value of the commercial orchard fruits of the region.

† Not given during the academic year, 1940-1941.

605. The Literature of Horticulture. Three credit hours. Winter Quarter. Three lectures each week. Given in alternate years. Mr. Gourley.

A study of the literature of horticulture.

607. Sprays and Spraying Practice. Three credit hours. Spring Quarter. Two lectures and one two-hour laboratory period each week. Given in alternate years. Not open for graduate credit for students majoring in Horticulture. Mr. Childers.

Designed to acquaint the student with the changing spray materials that appear on the market, the spray formulas, spray schedules for each of the fruits, and to give the student practice in preparing and applying the various spray mixtures.

***608. The Handling, Packing, and Storage of Fruit.** Three credit hours. Autumn Quarter. Two recitations and one two-hour laboratory period each week. Given in alternate years. Not open for graduate credit for students majoring in Horticulture. Mr. Childers.

Operations and equipment used in harvesting, handling, and storing fruits are studied. Emphasis is placed on time of picking, packing receptacles, packages, and the packing operation of tree and small fruits. The different types of storages and their construction and operation is also made a main feature of the course. Particular emphasis is given to the physiological principles underlying the common practices in the handling and storage of fruits.

***621. Systematic Study of Vegetables.** Three credit hours. Autumn Quarter. One recitation and two two-hour laboratory periods each week. Given in alternate years. Mr. Brown.

A systematic study of the botany and origin of the principal vegetable forms and varieties including their description, identification, and special table and storage qualities; adaptation of soils, and resistance to disease.

622. Advanced Vegetable Gardening. Five credit hours. Spring Quarter. Four recitations and one two-hour laboratory period each week. Mr. Brown.

A continuation of Horticulture 522.

Devoted to the study of the history, anatomy, physiology, and culture of the principal vegetable crops including propagation, choice of varieties, soil adaptation, soil preparation, planting, fertilizing, cultivation, pest control, harvesting, storage methods, marketing and cost of production, and income.

628. The Marketing of Fruits and Vegetables. Five credit hours. Spring Quarter. Five lecture periods each week. General prerequisites must include Rural Economics 613. Mr. Hauck.

The principles involved in marketing fruits and vegetables will be considered. Attention will be given to various phases of preparation for market, distribution, transportation, terminal facilities, auctions, inspection, market news, etc. Emphasis will be placed upon the market outlets and methods which are most suited to Ohio producers. One or two inspection trips of two or three days each will be made.

649. Advanced Plant Propagation. Five credit hours. Winter Quarter. Four recitations and one three-hour laboratory period each week. General prerequisites must include Horticulture 605. Mr. Chadwick.

This course is devoted to an intensive and detailed physiological, anatomical, and practical study of the principles and practices of propagation.

650. Principles and Practices of Nursery Management. Three credit hours. Spring Quarter. Two recitations and one three-hour laboratory period each week. General prerequisites must include Horticulture 649. Given in alternate years. Mr. Chadwick.

This course is designed to acquaint the student with the fundamentals and practices involved in the management of a modern nursery. The status of the industry, its development in general, and the growing, merchandising and marketing of nursery products in all its phases are considered. Trips to some of the nurseries in the state will be required.

652. Structure of Vegetables and Ornamental Plants. Three credit hours. Autumn Quarter. One recitation and two two-hour laboratory periods each week. Time to be arranged. Mr. Gourley.

A study of the structure of vegetables and ornamental plants as they relate to the economic production of these crops. The course is designed for advanced students who desire to make a critical study of horticultural plant materials.

* Not given in 1940-1941.

653. Structure of Economic Fruits. Three credit hours. Winter Quarter. One recitation and two two-hour laboratory periods each week. Time to be arranged. Mr. Gourley.

A study of the structure and vascular arrangement of horticultural fruits. The viewpoint and emphasis of this course are designed to familiarize students with the structures that play a part in the development of various types of fruits and the relation of these structures in cultural development, spraying, storage, and culinary use.

683. Arboriculture. Three credit hours. Autumn Quarter. Two recitations and one three-hour laboratory period each week. Mr. Chadwick.

A study of the care of ornamental trees and shrubs. Fertilization, spraying, pruning, and tree surgery. A suitable course for those interested in city forestry, park maintenance, and cemetery development.

701. Minor Investigations. Three to fifteen credit hours, taken in units of three or five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. All instructors.

This course is for students who desire to work out special problems in the fields of pomology, vegetable gardening, floriculture or forestry. Students will elect work in their desired subjects after a conference with the instructor in charge.

704. Horticultural Seminar. One credit hour. Autumn, Winter, and Spring Quarters. Required of all graduate students majoring in horticulture. All instructors.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Horticulture and Forestry. Autumn, Winter, and Spring Quarters. Graduate students may do investigational work in some phase of the following subjects: pomology, vegetable gardening, plant breeding, floriculture, and forestry. Mr. Gourley, Mr. Brown, Mr. Laurie, Mr. Chadwick, Mr. Childers, Mr. Howlett.

INDUSTRIAL ARTS EDUCATION

(See Education)

INDUSTRIAL ENGINEERING

Office, 125 Industrial Engineering Building

PROFESSORS YOUNGER AND KNIGHT (EMERITUS), ASSOCIATE PROFESSOR LEHOCZKY, ASSISTANT PROFESSORS RICKLY, SCHNEIDER, AND STITT, MR. COOPER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The following courses do not carry graduate credit for students who received the degree Bachelor of Industrial Engineering from The Ohio State University: 601, 602, 603, 623, 653, 661, 701, 702, 706, 751, 752, 761, and 762.

601. Management of Men in Engineering Industries. Four credit hours. One Quarter. Autumn, Winter, Spring. Four recitations each week. General prerequisites must include an acceptable course in elementary machine work or practical experience. Mr. Younger.

The development of engineering organizations and a study of existing organizations. The management of men in engineering organizations.

Not open to students who have credit for Industrial Engineering 712.

602. The Laws of Engineering Management. Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. General prerequisites must include an acceptable course in elementary machine work or practical experience. Mr. Lehoczky.

A consideration from an engineering standpoint of the fundamental laws of engineering management.

603. Time and Motion Study. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. General prerequisites must include a course in advanced machine work. Mr. Lehoczky.

Principles, aims and application of time and motion study; job analysis, standardization, formula construction, job and wage evaluation.

610. Special Problems. Two to five credit hours. Autumn, Winter, and Spring Quarters. Conference and laboratory. Permission of the instructor must be obtained. All instructors.

The course is designed to permit students in Industrial Engineering to carry on special work in some phase of Industrial Engineering not otherwise covered in a course. For example, the student may do advanced work in pattern-making, motion study, foundry, forge shop.

623. Advanced Machine Work. Three credit hours. Winter Quarter. One lecture and five hours laboratory each week. General prerequisites must include acceptable courses in advanced machine work. Mr. Cooper.

Shop practice in the construction of auxiliary production equipment, such as special tools, jigs and fixtures, with emphasis on accuracy, which is of great importance in the modern system of interchangeable manufacture.

641. Theory of Welding. Three credit hours. Winter Quarter. Two lectures or recittaions and one three-hour laboratory period each week. General prerequisites must include a course in forging, shop-heat-treating, and welding and Metallurgy 606. Mr. Stitt.

Fundamental methods and principles of welding; selection of method and type of welding, with due emphasis on economic factors. Welding symbols; metallurgical science pertaining to welding. Laboratory demonstrations.

646. Welding Science and Its Applications. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lectures or recitations each week. General prerequisites must include Mechanics 602. Mr. Stitt.

A basic study of welding and its applications.

653. Time Study Laboratory. Three credit hours. One Quarter. Autumn and Spring. One recitation and five laboratory hours each week. Industrial Engineering 603 must be taken concurrently. Mr. Lehoczky.

Laboratory application and practice of the subject matter given in Industrial Engineering 603 to a degree which enables the student to function as a time and motion study man in industry.

661. Production Control Charts. Three credit hours. One Quarter. Autumn, Winter, Spring. Two recitations and one two-hour laboratory period each week. Mr. Lehoczky.

The application of charts and graphs to production problems, organization, management, operation, labor and cost control. Laboratory exercises designed to supplement the theory.

701. Selection of Manufacturing Equipment. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include acceptable course in elementary machine work or practical experience. Mr. Younger.

The selection of manufacturing equipment. Specialized machines versus standard machines. The growing use of semi-automatic and full-automatic machine tools. Study of the product as regards machine tool to be used and the possibility of combining operations in one machine.

702. Work Routing. Four credit hours. Winter Quarter. Four recitations each week. General prerequisites must include a course in advanced machine work. Mr. Younger.

The engineering problems involved in the proper sequence in manufacturing operations. Types of plants to secure the best arrangements of equipment and processing. Handling and supervising the product at and between machines.

706. Methods of Waste Elimination. Four credit hours. Spring Quarter. Four lectures and recitations each week. Mr. Younger.

A study of industrial standards, their control and application. Simplification, inspection, waste elimination, and allied subjects.

712. Management of Men in Engineering Industry. Three credit hours. One Quarter. Autumn, Winter, Spring. Three lectures each week. Mr. Younger.

The developing of engineering organizations. Jobbing and production shops. The coordination and organization of engineering functions. Work-analysis and routing. The handling of men in engineering organizations.

Not open to students who have credit for Industrial Engineering 601.

741. Welding Engineering and Applications. Three credit hours. Autumn Quarter. Three lectures or recitations each week. General prerequisites must include Industrial Engineering 641 and Mechanics 605. Mechanics 702 must be taken concurrently. Mr. Stitt.

Continuation of Industrial Engineering 641; welding specifications, inspection and applications. Effect on manufacturing processes and construction.

742. Welding Design. Three credit hours. Winter Quarter. Two lectures or recitations and one three-hour laboratory period each week. General prerequisites must include Industrial Engineering 741, Civil Engineering 712, and Mechanical Engineering 727. Mechanical Engineering 728 must be taken concurrently. Mr. Stitt.

Welding design in the mechanical and structural fields; economic comparisons of welding designs and other methods of manufacture. Laboratory practice in computations and welding drawings.

743. Advanced Welding Design. Five credit hours. Spring Quarter. Three lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Industrial Engineering 742 and Mechanical Engineering 728. Mechanical Engineering 743 must be taken concurrently. Mr. Stitt.

Continuation of Industrial Engineering 742, with more complicated designs.

751. Tool Engineering. Three credit hours. Autumn Quarter. One recitation and six hours of drawing-room practice each week. General prerequisites must include a course in advanced machine work. Mr. Rickly.

A course in the design of tools, jigs, and fixtures. Attention given to the forms, life and efficiencies of cutting tools. The simple elements of fixture design, such as different forms, locating points, clamping devices, and standardized parts, with drawing-room practice leading up to design of the more complicated fixtures.

752. Work-Routing Laboratory. Three credit hours. Winter Quarter. One recitation and two three-hour laboratory periods each week. Industrial Engineering 702 must be taken concurrently. Mr. Lehoczky.

Practice in the work of selecting and placing machine tools and laying out departments in their proper sequence for manufacturing specific products to best economic advantage.

761. Elementary Production Control. Three credit hours. One Quarter. Autumn and Winter. Three lectures and recitations each week. General prerequisites must include Industrial Engineering 601. Mr. Lehoczky.

Quantitative analysis from the standpoint of cost control of machines, equipment, and labor.

762. Advanced Production Control. Three credit hours. One Quarter. Winter and Spring. Three lectures and recitations each week. General prerequisites must include Industrial Engineering 761. Mr. Lehoczky.

The application of quantitative methods of control in industry in the fields of inverse relationships, least cost combinations, purchasing quantities, seasonal production and related problems.

763. Production Control Research. Three credit hours. One Quarter. Autumn and Spring. Conference, laboratory, and field work. Consent of the instructor must be obtained. Mr. Lehoczky.

The student has a choice of one of two programs. He may do research in advanced phase of material covered in Industrial Engineering 761 and 762, or he may apply the principles taught in such courses as 603, 661, 752, 761, and 762 to the problems of a manufacturing plant. The latter program involves from 60 to 100 hours in a local plant.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Industrial Engineering. Autumn, Winter, and Spring Quarters. Mr. Younger, Mr. Lehoczky.

Research work in the various phases of Industrial Engineering: production control, production economics, time and motion study, shop processes, etc.

ITALIAN

(See Romance Languages and Literature)

JOURNALISM

Office, 203 Journalism Building

PROFESSORS POLLARD, MYERS (EMERITUS), AND HOOPER (EMERITUS), ASSOCIATE PROFESSOR LUXON, ASSISTANT PROFESSORS GETZLOE AND DOAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. News Editing. Three credit hours. Spring Quarter. Two recitations and one two-hour laboratory period each week. General prerequisites must include a course in copyreading. Permission of instructor necessary. Mr. Luxon.

Study of and practice in the evaluation of news, especially that furnished by press associations. Study of contemporary telegraph and cable news in the daily press, with a comparison of the editing and news evaluation of different newspapers, including rewrite.

602. Feature Writing. Three credit hours. One Quarter. Autumn and Spring. Two recitations and one laboratory period each week on the Lantern. Special permission necessary. Mr. Getzloe.

Instruction in and writing of special newspaper and magazine articles, together with investigation as to the market for such matter.

Not open to students who have credit for Journalism 502.

603. Critical Newspaper Writing. Three credit hours. Spring Quarter. General prerequisites must include elementary courses in journalism or permission of the instructor must be obtained. Mr. Getzloe.

Study of the work of the newspaper dramatic, literary, music, and art critic, with practice in the writing of reviews and criticism.

605. Writing Radio News. Three credit hours. One Quarter. Winter and Spring. Special permission of the instructor is required. Mr. Luxon.

The study of the problems of preparing and presenting news material for the radio. Emphasis on the gathering, selection, and editing of news material for radio broadcasting. Practice in the processing of press association reports for newscasts and in the adaptation of newspaper editorial contents for broadcast purposes.

614. Law of the Press. Five credit hours. One Quarter. Autumn and Spring. Five recitations each week. General prerequisites must include elementary courses in journalism. Mr. Pollard.

Origin and development of the freedom of the press; history, principles, and provisions of the laws of libel and copyright and of other statutes affecting peculiarly newspapers and other publications.

Not open to students who have credit for Journalism 514.

621. The Editorial Page. Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. Mr. Getzloe.

Study of the purpose, form, style, and spirit of the editorial. Consideration of current events, practice in news interpretation and other editorial writing, and study of editorial pages.

622. The Press and Contemporary Affairs. Three credit hours. Winter Quarter. Three recitations each week. Mr. Doan.

The place of the newspaper in the social system. Study of its function and nature as an agency affecting public opinion. Discussion and interpretation of current events. The effects of pressure groups and propaganda upon the press.

623. Comparative Journalism. Three credit hours. Spring Quarter. General prerequisites must include a course in the history of journalism in the United States and elementary courses in political science. Mr. Luxon.

Consideration of the press of other nations, particularly that of the democratic as against the dictator countries, and by comparison and contrast with that of the United States. A study of various aspects of government control and censorship in other nations in terms of current developments.

625. Journalism Practice. Two to five credit hours. All Quarters. A laboratory course in which work is done off the campus.

Credit in this course is given to students who complete, under prearranged supervision of the School of Journalism, not less than eight weeks as full-time paid staff members of a newspaper or newspapers approved by the School.

626. The Newspaper Business Office. Three credit hours. Winter Quarter. Three recitations each week. Mr. Pollard.

Consideration of the tasks and problems of the newspaper business manager, such as location, valuation, cost-finding, and advertising from the publisher's standpoint.

Not open to students who have credit for Journalism 526.

628. Newspaper Circulation and Promotion. Three credit hours. Spring Quarter. Three class meetings each week. General prerequisites must include Journalism 626. Mr. Pollard.

Factors affecting newspaper circulation. Types of newspaper circulation, and their evaluation. Circulation methods and policies in use on various types of newspapers, together with promotional, merchandising, and service functions of the newspaper.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

802-803-804. Seminar in Journalism. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Pollard, Mr. Luxon, Mr. Doan.

Lectures, individual research, and group discussions participated in by those investigating related subjects. A study of the newspaper in its relation to democracy, and of the outstanding figures in journalism.

950. Research in Journalism. Autumn, Winter, and Spring Quarters. Mr. Pollard, Mr. Luxon.

LATIN LANGUAGE AND LITERATURE

(See Classical Languages and Literature)

LAW

Office, 113 Page Hall

EXECUTIVE COMMITTEE: PROFESSORS MARTIN, HARRIS, AND MATHEWS
PROFESSORS TUTTLE, MATHEWS, LATTIN, HUNTER, ROSE, MARTIN, AND STRONG

Constitutional Law. Eight credit hours. Three hours, Autumn Quarter; two hours, Winter Quarter; three hours, Spring Quarter. Mr. Strong.

A study of American constitutional law as developed through an examination of the jurisdiction, powers, techniques, and functions of the Supreme Court of the United States. The greater part of the course is devoted to the functions of the Court in umpiring federal-state and state-state relationships and in balancing governmental and private interests. Consideration of these functions involves the study of the basic constitutional doctrines of due process, police power, full faith and credit, obligation of contract, privileges and immunities, equal protection, intergovernmental immunities, commerce among the states, and separation of powers. Although emphasis is thus upon federal constitutional law, similarities in constitutional doctrine together with occasional reference to doctrines unique to the States, serve to provide as well a background training in state constitutional law.

Material to be announced.

Contracts. Nine credit hours. Three credit hours each Quarter. Autumn, Winter, Spring.

Offer and acceptance, consideration, third party beneficiaries, assignments, joint rights and duties, statute of frauds, performance of contracts, conditions precedent and subsequent, impossibility, illegal contracts, and discharge.

Casebook to be announced.

***International Law.** Three credit hours. Winter Quarter. Mr. Mathews.

A study of the principles of law governing intercourse between nations, chiefly as interpreted and applied by judicial and administrative bodies.

Hudson's Cases on International Law.

Jurisprudence. Three credit hours. Winter Quarter. Mr. Rose.

A study of judicial reasoning based on a survey of prevailing legal philosophies. Selected materials and cases.

Labor Relations Seminar. Six credit hours. Three hours, Autumn Quarter; three hours, Winter Quarter. Mr. Mathews.

The course will be conducted as a series of problems analyzed and presented by the students: the material used will be court decisions, administrative rulings, statutes and relevant economic and social data. Experts will be invited to attend periodically and to participate in the discussion; persons from educational, industrial, and labor fields. Problems will vary in accordance with contemporary significance, but illustrations are as follows: inducing breach and termination of employment contracts; anti-union contracts; legislative regulation of employment contracts; objectives of strikes and conduct of strikers; boycotts as pressure devices; application of anti-trust laws; trade agreements; trade dispute, nature and legal significance; arbitration and mediation; unfair labor practices and employee representation under the National Labor Relations Act; jurisdictional and intra-union dispute; procedure and fair hearing under the above Act; regulation of wages and hours of labor.

Legal Ethics. Two credit hours. Spring Quarter.

The nature of a profession; pecuniary limitations, advertising, solicitation, fees; lawyers' oath; ethical duties of lawyers to society, to courts, to clients, to litigants; ethics of employment.

Arant's Cases on Legal Ethics.

Legal Method and Personal Property. Three credit hours. Autumn Quarter. Mr. Rose.

Wherein cases on Personal Property are used both to present the substantive law of that subject (possession, finders, lien, pledge and acquisition of ownership) and to illustrate various philosophies of law, the use of judicial logic and the doctrine of precedent.

Bigelow's Cases on Personal Property, Second Edition.

***Legislation.** Three credit hours. Autumn Quarter. Mr. Mathews.

Declaratory and regulatory, general and special, legislation. Legislation by reference, statutory disabilities, liabilities, facilities, certification and requirements. Regulation through classification, deferred control, and organization. Standards and formulas of adjustment. Technique of penal regulation: designations and markings, private records, notice to adverse parties, registration, powers of inspection, problems of adverse publicity, licensing, and enforcement provisions. Discussion will be based upon selected statutes, largely Ohio, supplemented by special problems.

Mortgages. Three credit hours. Autumn Quarter. Mr. Mathews.

Nature and elements of a mortgage, legal and equitable, real and personal; incidents of the mortgage relation, right to possession and remedies of the mortgagee; discharge by payment, tender and merger; subrogation; assignments; redemption; foreclosure; extent of the lien, priorities between liens and competing claimants; and conveyance of the equity of redemption.

Casebook to be announced.

Municipal Corporations. (Reading Course). Two credit hours. Spring Quarter. Mr. Tuttle.

A reading course, based upon Ohio and other materials, designed to give the student a working knowledge of the nature of municipal corporations, the evolution of municipal home rule, legal problems arising from home rule in Ohio, in police and taxing powers of municipal corporations, and their liability, common law and statutory, in contract and tort.

In this course students are expected to work out the subject matter of the course through suggested readings in cases, texts, and articles. Students have the privilege of conferring with the instructor in charge of the course once a week at an hour designated for that purpose.

Negotiable Instruments. Four credit hours. Winter Quarter. Mr. Hunter.

Types of Commercial or Negotiable paper; transfer; purchase and payment in due course, discount and security.

Steffen, Cases on Commercial and Investment Paper.

* Not given in 1940-1941.

Private Corporations. Six credit hours. Four hours, Autumn Quarter; two hours, Winter Quarter. Mr. Lattin.

A consideration of the business corporation as a device for the furtherance of trade and of manufacturing, with emphasis upon the law of corporate finance and upon problems of present-day importance. More specifically, the course is a study of the formation of corporations; the separate corporate capacity or entity privilege and its limitations; the criminal and tort liability of corporations; directors and management; rights and liabilities on contracts as effected by the statement of corporate purposes in the articles; rights and powers of shareholders; issue of shares and subscriptions, underwriting, marketing of securities; stock structure and classes of shares; capital requirements and declaration of dividends; redemption of shares; reduction of legal capital; liabilities of shareholders, directors, and promoters to the corporation and to creditors in connection with the issue of shares; transfer of shares (rights and liabilities of the corporation, transferor and transferee); fundamental changes in the corporate organization; minority rights; and shareholders' actions.

Ballantine and Lattin's Cases and Materials on Corporations.

Public Utilities. Three credit hours. Spring Quarter. Mr. Hunter.

The public utility concept as developed at common law and by statute; the obligations of the public utility status and their enforcement.

Welch's Cases on Public Utility Regulation, Second Edition.

Real Property. Seven credit hours. Four hours, Winter Quarter; three hours, Spring Quarter. Mr. Martin.

A study of interests in land and their transfer *inter vivos*. Possessory estates; concurrent ownership; an introduction to nonpossessory estates. Formalities of execution, content, and construction of Conveyances. Estoppel by deed; adverse possession and adverse use; zoning laws; statutory liens. The Recording system; title registration.

Martin, Cases on Interests in Land (Mimeographed).

Martin, Cases on Conveyances.

Rights in Land. (Reading Course). Two credit hours. Spring Quarter. Mr. Martin.

Rights incident to the possession of land; profits, easements; licenses; covenants in leases; covenants running with the land; equitable servitudes; rents; waste; public rights.

In this course students are expected to work out the subject matter of the course through suggested readings in cases, texts, and articles. Students have the privilege of conferring with the instructor in charge of the course once a week at an hour designated for that purpose.

Sales. Three credit hours. Spring Quarter. Mr. Lattin.

Transfer of title to personal property as a result of contract; rules for determining intent as to relative time of its transfer; different types of sales; documents of title; obligations of seller and buyer as to warranties; delivery and payment, inspection, acceptance; rights of unpaid seller.

Bogert and Britton's Cases on Sales.

MANUAL ARTS

(See Education)

MATHEMATICS

Office, 306 University Hall

PROFESSORS KUHN, RASOR, MORRIS, BLUMBERG, RADO, AND WEAVER, ASSOCIATE PROFESSORS BAMFORTH AND LaPAZ, ASSISTANT PROFESSORS BAREIS, BEATTY, CARIS, AND RICKARD

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40. These general prerequisites include an acceptable course in calculus.

601. Advanced Calculus. Five credit hours. Autumn Quarter. Mr. Weaver.

Selected topics from Advanced Calculus.

607. Introduction to the Theory of Functions of a Complex Variable. Five credit hours. Winter Quarter. General prerequisites must include Mathematics 601. Mr. Rasor.

The algebra of complex numbers with their corresponding geometric representation; conformal representation; theory of power series; definition and properties of analytic functions; introduction to the theory of functions as developed by Cauchy, Riemann, and Weierstrass with applications in physics and engineering.

611. Differential Equations. Five credit hours. Winter Quarter. Mr. Kuhn.

Linear equations with constant coefficients; equations of first, second, and higher orders; numerical approximations; solutions in series; existence theorems of Picard, Cauchy, and Frobenius; simple partial differential equations; applications.

***617. Introduction to Modern Mathematics.** Five credit hours. Autumn Quarter.

The content will be selected from the following fields: graphical and numerical methods, projective geometry, theory of numbers, the mathematical continuum, mathematical foundations, point sets, groups, probability, and relativity. In general, topics of interest to high school teachers will be discussed.

***621. Advanced Euclidean Geometry.** Five credit hours. Winter Quarter. Mr. Weaver.

Geometric constructions; points, lines and circles associated with a triangle; harmonic ranges and pencils; harmonic properties of the circle; radical axis; pole and polar with respect to a circle; inversion; symmedian points; Brocard points. This is chiefly a problem course in the field of plane geometry, and is of special value to teachers of this subject.

623. Projective Geometry. Five credit hours. Spring Quarter. Miss Bareis.

Plücker line coordinates, duality, infinite elements, projection, double ratio, projective coordinates in one and two dimensions, projective transformations, collineations and involutions in one dimension, projective properties of conics.

***625. Solid Analytical Geometry.** Five credit hours. Autumn Quarter. Given in alternate years. Miss Bareis.

Systems of co-ordinates; planes and lines; types of surfaces; quadric surfaces; duality.

***641. Elementary Theory of Equations.** Five credit hours. Autumn Quarter. Mr. Rasor.

Construction with ruler and compasses, numerical equations, determinants, symmetric functions. Text: Dickson's First Course in the Theory of Equations.

651. Fundamental Ideas in Algebra and Geometry. Three credit hours. Autumn Quarter. Mr. Kuhn.

The aims of this course are to provide a suitable mathematical background for (a) teachers and prospective teachers of secondary school mathematics and (b) students who desire a better appreciation of modern science. The content will include a discussion of rational numbers, real numbers, complex numbers, hyper-complex numbers, and finite fields; finite groups, theory of numbers; number scales; empirical and historical development of algebraic and geometric facts; undefined elements; types of assumptions used in algebra and geometry; Euclidean geometry; and certain non-Euclidean geometries.

652. Fundamental Ideas in Algebra and Geometry. Three credit hours. Winter Quarter. General prerequisites must include Mathematics 651 or the permission of the instructor must be obtained. Mr. Kuhn, Mr. Weaver.

A continuation of Mathematics 651.

653. Fundamental Ideas in Algebra and Geometry. Three credit hours. Spring Quarter. General prerequisites must include Mathematics 652 or the permission of the instructor must be obtained. Mr. Kuhn.

A continuation of Mathematics 652.

661. Vector Analysis. Five credit hours. Spring Quarter. General prerequisites must include Mathematics 601 and a course in physics, or the equivalent. Mr. Weaver.

Vector and scalar algebra and geometry, differentiation and differential operators, applications to electrical theory and to mechanics, dynamics, and hydro-dynamics.

***671. Introduction to the Theory of Relativity.** Five credit hours. Spring Quarter. General prerequisites must include Mathematics 661. Mr. Blumberg.

This course will be prefaced by a brief review of those parts of the classical theories of dynamics and physics which are necessary to an understanding of the special theory of relativity, its applications, and the elementary aspects of the general theory of relativity.

* Not given in 1940-1941.

691. Probability. Five credit hours. Autumn Quarter. Given in alternate years. General prerequisites must include a course in calculus. Mr. Morris.

The first half of the course will be devoted to the development of the theory of probability from the standpoint of permutations, combination, choice and chance; the second half to a formal development of the subject as given by Coolidge in "Introduction to Probability."

692. Finite Differences. Five credit hours. Winter Quarter. Given in alternate years. General prerequisites must include Mathematics 691. Mr. Morris.

An introduction to finite differences; development of the more important methods of interpolation and summation.

696. Statistics. Five credit hours. Spring Quarter. Given in alternate years. General prerequisites must include Mathematics 692. Mr. Morris.

Derivation of statistical formulas by use of the theory of probability; least squares and their application to curve fitting; frequency distribution curves.

700. Minor Problems. Three to five credit hours. Autumn, Winter, and Spring Quarters.

This course consists of conferences, assigned readings, and reports for minor investigations.

701. Introduction to Analysis I. Five credit hours. Autumn Quarter. Permission of instructor must be obtained. Mr. LaPaz.

The principal aim will be to train the student in handling with some facility various fundamental notions and methods in analysis. The subject matter will be selected from the following topics: the real continuum; introduction to the theory of Point Sets; basal notions in the field of real functions; measure; Riemann, Lebesgue, and other integrals; multiple integrals; Green's and related theorems; implicit functions; series, and in particular, introduction to Fourier series.

702. Introduction to Analysis II. Five credit hours. Winter Quarter. Permission of instructor must be obtained. Mr. LaPaz.

A continuation of Mathematics 701.

703. Introduction to Analysis III. Five credit hours. Spring Quarter. Permission of instructor must be obtained. Mr. LaPaz.

A continuation of Mathematics 702.

741-742-743. Introduction to Higher Geometry. Five credit hours. Autumn, Winter, and Spring Quarters. Permission of the instructor must be obtained. Mr. Radó.

Metric, affine, and projective properties of conic sections and of quadric surfaces. Fundamental notions of differential geometry. Geometry on a surface. Non-Euclidean geometries. Groups of transformations.

***761-*762-*763. Introduction to Higher Algebra.** Five credit hours. Autumn, Winter, and Spring Quarters. Permission of the instructor must be obtained. Mr. Bamforth, Mr. LaPaz.

Elementary theory of number; congruences; binary forms; continued fractions; groups; fields; matrices; invariants; elementary divisors; Galois fields; algebraic fields; ideals.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 687.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Students intending to specialize in mathematics should acquire as soon as possible a reading knowledge of French, German, and Italian.

NOTE: Students should consult with instructors before registering for courses open only to graduates.

GRADUATE MATHEMATICS CLUB

The Graduate Mathematics Club fosters interest in the latest advances in Mathematics, its application and its pedagogy. The meetings, which are held fortnightly consist of reports by members of the staff and by graduate students on their own investigations or on recent books or journal articles, and of addresses intended to orient the members of the Club in reference to various mathematical branches of wide scope. As far as possible, the presentation of the papers demands a minimum of technical equipment on the part of the hearers and is on the whole

* Not given in 1940-1941.

intended to be intelligible to students beginning their graduate work. Since it is the Graduate Mathematics Club which brings into special focus the living, growing character of mathematical science, it is expected that all graduate students of mathematics will cooperate in the work of the Club and attend the meetings regularly.

***801-*802-*803. Theory of Functions of a Complex Variable.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. Radó.

Fundamentals. Application to Conformal Mapping.

804-805-806. Point Sets and Real Functions. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. Blumberg.

A development of the ideas from the simplest to those contained in current literature. The principal aim is the comprehension of the principles for asking and answering questions in this field.

***807-*808-*809. Ordinary and Partial Differential Equations.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. Bamforth.

Existence theorems; properties of solutions depending upon initial conditions and parameters; geometrical properties of solutions; dynamical systems; stability of solutions; linear differential equations. Applications to problems in engineering, physics, chemistry.

***810-*811-*812. Calculus of Variations.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 703 or permission of the instructor must be obtained. Mr. LaPaz.

Formulation of typical problems; classical necessary conditions; the Jacobi condition and the criteria for conjugate points due to Bliss; imbedding theorems and the Weierstrass sufficiency proof; the Hamilton-Jacobi theory; double integral problems; inverse problems and direct methods in the calculus of variations; applications in engineering, physics, and Riemannian geometry.

813-814. Mathematical Methods in Theoretical Physics. Three credit hours. Autumn and Winter Quarters. General prerequisites must include Mathematics 601 or permission of the instructor must be obtained. Mathematics 813 and 814 are prerequisite for Physics 860 and 861. Mr. Bamforth.

This course aims to discuss from a mathematical point of view topics which are fundamental in the study of modern theoretical physics, such as series development of arbitrary functions, integral equations, calculus of variations, boundary value problems, and potential theory.

816. Fourier's Series and Spherical Harmonics. Three credit hours. Spring Quarter. General prerequisites must include Mathematics 701, 702, or permission of the instructor must be obtained. Mr. Bamforth.

Convergence, summability, integration and differentiation of Fourier's Series, expansions of functions in terms of Legendre's Polynomials, and surface spherical harmonics; applications to physics.

818. Infinite Series and Products. Three credit hours. Spring Quarter. General prerequisites must include ten Quarter-hours of mathematics beyond calculus. Mr. Blumberg.

This course includes selections from the following topics: theories of irrationals; series of positive terms; convergence tests; general series; double series; transformation of series; infinite products; Fourier, Dirichlet, and power series; special series; divergent series.

†820. Integral Equations. Three credit hours. Spring Quarter.

†823. Tensor Analysis. Three credit hours. Spring Quarter. Permission of the instructor must be obtained.

Foundations and algorithms of the metric tensor calculus; applications in the theory of relativity; the geometry of paths; tensors of the calculus of variations.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

†825. Partial Differential Equations. Three credit hours. Permission of the instructor must be obtained.

A study of partial differential equations of the first and second order, with special attention to the various applications to geometry and physics.

*841-*842-*843. Differential Geometry. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mathematics 743 or permission of the instructor must be obtained. Mr. Radó.

Review of fundamental notions. Applications of the general theory to special problems, in particular to problems in the large and to variation problems arising in connection with length, area, volume, curvature.

861. Theory of Fields. Three credit hours. Autumn Quarter. General prerequisites must include Mathematics 763. Mr. Radó.

Steinitz's theory of fields.

*862. Theory of Matrices. Three credit hours. Winter Quarter. General prerequisites must include Mathematics 861. Mr. Radó.

Advanced topics in the theory of matrices with particular attention to matrices with integral elements.

*867. Linear Algebras. Three credit hours. Winter Quarter. General prerequisites must include Mathematics 862.

A study of linear algebras and their arithmetics, with particular attention to Dickson's theory of hypercomplex integers.

*868. Theory of Ideals. Three credit hours.

Ideal theory of commutative and non-commutative rings.

†871-*872. Finite Groups. Three credit hours. Winter and Spring Quarters. Permission of the instructor must be obtained. Mr. Kuhn.

Fundamentals of the theory of finite groups; the abstract, permutation, and linear groups; the Galois theory of equations; applications.

874. Continuous Groups. Three credit hours. Winter Quarter. Permission of the instructor must be obtained. Mr. Bamforth.

A study of Lie's theory of r-parameter continuous groups with an introduction to some of the recent investigations of Cartan and Weyl.

*891. Advanced Statistics. Three credit hours. Spring Quarter. General prerequisites must include Mathematics 696. Mr. Morris.

Small sample theory and its applications to statistical problems.

950. Research in Mathematics. Autumn, Winter, and Spring Quarters. Library work and conferences. Permission of the department must be obtained.

MECHANICAL ENGINEERING

Office, 247 Robinson Laboratory

PROFESSORS MARQUIS, NORMAN, JUDD (EMERITUS), BROWN, BUCHER, AND STINSON, ASSOCIATE PROFESSORS MOFFAT, BEITLER, AND ROBERTS, MR. MARCO, MR. LINDAHL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These general prerequisites include fundamental courses in mathematics, physics, and mechanics.

The following courses do not carry graduate credit for students who received the degree of Bachelor of Mechanical Engineering from The Ohio State University: 605, 607, 608, 609, 615, 625, 627, 664, 665, 727, 728, 742, 744, 779, 780, and 781.

605. Heating and Ventilating. Four credit hours. Spring Quarter. Four recitations each week. General prerequisites must include a course in heat-power engineering. Mr. Lindahl.

A descriptive and analytical study of the apparatus and machinery and of the layouts used in the heating and ventilating of buildings.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

607. Heat-Power Engineering. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include a course in engineering drawing and three Quarters of elementary chemistry. Mr. Marquis, Mr. Bucher.

The beginning of a study of thermodynamics, and of an analytical and descriptive study of steam-generating and steam-using machinery, and of air compression and refrigeration.

608. Heat-Power Engineering. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include Mechanical Engineering 607. Mr. Marquis, Mr. Bucher.

The continuation of Mechanical Engineering 607.

609. Heat-Power Engineering. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 608. Mr. Marquis, Mr. Bucher.

The continuation of Mechanical Engineering 608.

611. Heat Transmission. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 608. Mr. Brown, Mr. Marco.

Study of the laws of heat transmission as applied in the design of buildings, heaters, coolers, condensers, evaporators, and engine cylinders.

615. Mechanism. Five credit hours. Autumn Quarter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include a course in engineering drawing. Mr. Stinson, Mr. Moffat.

A classroom and drawing-board study of mechanisms and kinematics of machines.

617. Mechanical Engineering Laboratory. Four credit hours. Autumn Quarter. Two recitations and one four-hour laboratory period each week. General prerequisites must include Mechanics 610 and Metallurgy 651. Mr. Beitler, Mr. Lindahl.

Lecture and recitations on pressure and temperature measurements, on steam engines and turbines, and on boilers and combustion. Laboratory work in the calibration of pressure gauges and indicator springs; testing of steam engines, pumps and boilers.

625. Internal Combustion Engines. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 608 and 615. Mr. Stinson, Mr. Roberts.

A study of internal combustion engines and their auxiliaries.

627. Materials of Engineering. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include three Quarters of elementary chemistry. Mr. Moffat, Mr. Marco.

A study of the production and properties of the materials used in engineering structures and machinery.

Not open to students who have credit for Mechanical Engineering 427.

664. Mechanical Engineering Laboratory. Three credit hours. Winter Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 607 and Mechanics 610; Mechanics 602 and Mechanical Engineering 608 must be taken previously or concurrently. Mr. Brown, Mr. Roberts.

The calibration of thermometers, pressure gauges, and other instruments; indicator practice; operation of steam engines; tests of oils, lubricants, the materials of construction, and of steam engines.

665. Mechanical Engineering Laboratory. Three credit hours. Spring Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 608 and 664. Mechanical Engineering 609 and Mechanics 607 must be taken previously or concurrently. Mr. Brown, Mr. Marco, Mr. Lindahl.

Valve setting, moisture determination in steam, gas calorimetry, measurements of the flow of water by means of orifices, nozzles, weirs, and venturimeters, and tests of steam engines.

673. **Mechanical Engineering Laboratory.** Four credit hours. Autumn Quarter. Two recitations and one four-hour laboratory period. General prerequisites must include Mechanics 610. Mr. Beitler, Mr. Marco, Mr. Lindahl.

Study of the flow of liquids and gases. Lectures and recitations on applied hydraulics, steam engines, and boilers. Practice in the calibration of weirs, orifices, and venturimeters. The operation and testing of steam engines and of reciprocating and centrifugal pumps.

674. **Mechanical Engineering Laboratory.** Four credit hours. Winter Quarter. Two recitations and one four-hour laboratory period each week. General prerequisites must include Mechanical Engineering 673. Mr. Beitler, Mr. Lindahl.

The continuation of Mechanical Engineering 673.

703. **Aeronautical and Automotive Engines.** Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include Mechanics 602 and 607, and Mechanical Engineering 625 or 674. Mr. Stinson.

A descriptive and analytical study of automotive and aeronautical engines and their auxiliaries.

704-705. **Automotive Engineering.** Three credit hours. Winter and Spring Quarters. Three recitations each week. General prerequisites must include Mechanical Engineering 625 or 703. Mr. Stinson.

An advanced study of automotive engines, chassis and auxiliaries.

710. **Heating and Ventilating.** Four credit hours. Autumn Quarter. Four recitations each week. General prerequisites must include Mechanical Engineering 611. Mr. Brown, Mr. Marco.

Study of the heating and cooling requirements of buildings and of the mechanical equipment used for heating and ventilating. Problems in the design of heating and ventilating systems.

Not open to students who have credit for Mechanical Engineering 605.

716. **Refrigeration and Air Conditioning.** Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 710. Mr. Brown.

Study of the mechanical processes and of the machinery used in refrigeration, and of the methods and equipment used for controlling conditions of air for comfort, health, and industrial purposes.

725. **Diesel Engines.** Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 625 or 704. Mr. Stinson.

An advanced study of Diesel-engine design, operation and economics.

727. **Machine Design.** Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include Mechanics 602 and 605 or 607. Mechanical Engineering 609 and 615 or a course in engineering drawing. Mr. Norman.

A detailed course of study based upon mechanics and the materials of construction applied to the design and construction of machinery.

728. **Machine Design.** Five credit hours. Winter Quarter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include Mechanical Engineering 727. Mr. Norman, Mr. Marco.

The continuation of Mechanical Engineering 727.

742. **Hydraulic Machinery.** Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Mechanics 610 and Mechanical Engineering 609, 617, or 673. Mr. Beitler, Mr. Lindahl.

The application of hydraulic principles to hydraulic machinery.

743. **Machine Design.** Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanical Engineering 728. Mr. Norman.

The continuation of Mechanical Engineering 728.

744. Machine Design. Five credit hours. Spring Quarter. Three recitations and two three-hour laboratory periods each week. General prerequisites must include Mechanical Engineering 728. Mr. Norman, Mr. Marco.

The continuation of Mechanical Engineering 728.

757. Aeronautical Engineering. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Mechanics 602, 607, and 610. Mr. Stinson.

A descriptive and analytical study of the various forms of aircraft and the elementary principles of aerodynamics.

779. Mechanical Engineering Laboratory. Three credit hours. Autumn Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 609, 625, and 665. Mr. Brown, Mr. Bucher, Mr. Marco, Mr. Roberts.

Tests of steam engines; steam boilers; gas, oil and automotive engines; air compressors; centrifugal, rotary and power pumps; impulse and turbine water wheels; fans and blowers; steam turbines.

780. Mechanical Engineering Laboratory. Three credit hours. Winter Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 779. Mr. Bucher, Mr. Roberts, Mr. Stinson.

The work undertaken will be elected from the following:

(a) General Mechanical Engineering Laboratory. Tests of mechanical equipment such as air compressors, steam turbines, fans, oil, gas, and automotive engines, pumps, and hydraulic turbines, so selected as to be fundamental to all branches of mechanical engineering.

(b) Automotive Engineering Laboratory. Tests of apparatus of special interest in automotive engineering such as internal combustion engines, and complete vehicles, in the laboratory and on the road. To be taken only by students who elect Mechanical Engineering 704.

781. Mechanical Engineering Laboratory. Three credit hours. Spring Quarter. One five-hour laboratory period each week. General prerequisites must include Mechanical Engineering 780. Mr. Brown, Mr. Bucher, Mr. Stinson, Mr. Roberts.

The work undertaken will be elected from the following:

(a) General Mechanical Engineering Laboratory. A continuation of Mechanical Engineering 780-a.

(b) Automotive Engineering Laboratory. A continuation of Mechanical Engineering 780-b. To be taken only by students who elect Mechanical Engineering 705.

(c) Hydraulic Power Laboratory. A laboratory study of the dynamics of jets, the flow and measurement of water and the testing of impulse and reaction turbines. To be taken only by students who have credit for Mechanical Engineering 742.

799. Special Problems in Advanced Mechanical Engineering. Two to ten credit hours. Autumn, Winter, and Spring Quarters. All instructors.

This course is intended to give the advanced student opportunity to pursue special studies not offered in the fixed curriculum. Work undertaken will be elected from aeronautical engineering, heating, ventilating and air conditioning, hydraulic power, air compression, refrigeration, steam turbines, internal combustion engines, and other special problems in Advanced Mechanical Engineering. A student may repeat this course until he has obtained a maximum of 24 credit hours. He may accumulate not more than ten credit hours in any one of the above subdivisions.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include a collegiate course in mechanics, strength of materials, machine design, steam or gas engines and knowledge of the fundamentals of hydraulics. For major work a student must hold a baccalaureate degree in mechanical engineering or the equivalent.

The following courses are offered in one or more Quarters (Autumn, Winter and Spring). The work may include lectures, conferences, library, drawing board and laboratory work. Credit hours (unless definitely stated) to be arranged.

804. Advanced Mechanical Engineering. Two to eight credit hours. The course is offered in one or more Quarters. Autumn, Winter, Spring. The work includes conferences, library, drawing board, and laboratory work.

a. Internal Combustion Engines. Mr. Stinson, Mr. Roberts.
b. Steam Power Plants. Mr. Marquis, Mr. Bucher.
c. Machine Design. Mr. Norman.
d. Heating and Ventilating. Mr. Brown.
e. Hydraulics.

950. Research in Mechanical Engineering. Research work in any of the following fields, under the supervision of the following instructors: automotive engineering and internal combustion engines, Mr. Stinson, Mr. Roberts; heating, ventilating, air conditioning, and refrigerating, Mr. Brown; applied hydraulics, Mr. Beitler; machine design and mechanical vibration, Mr. Norman; materials of engineering, Mr. Moffat; steam engineering and fuel testing, Mr. Marquis, Mr. Bucher.

MECHANICS

Office, 205 Industrial Engineering Building

PROFESSORS OTT AND BOYD (EMERITUS), ASSOCIATE PROFESSORS FOLK AND POWELL, ASSISTANT PROFESSORS CLARK AND TUCKER, MR. WILLIAMS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include acceptable courses in differential and integral calculus and physics.

601. Statics. Five credit hours. One Quarter. Autumn and Winter. Five recitations each week. All instructors.

602. Strength of Materials. Five credit hours. One Quarter. Autumn, Winter, Spring. Four recitations and one two-hour laboratory period each week. General prerequisites must include a course in statics. All instructors.

Stresses and deformations: torsion; riveted and welded joints; deflection of beams and columns by double integration; horizontal shear; combined stress.

605. Strength of Materials. Two credit hours. One Quarter. Autumn and Spring. Two recitations each week. General prerequisites must include Mechanics 602. Mr. Ott, Mr. Folk, Mr. Clark, Mr. Williams.

Combined stress; resilience in bending and torsion; inclined beams; deflection by area moments; statically indeterminate and tapered beams; lateral buckling of beams.

607. Dynamics. Three credit hours. One Quarter. Autumn, Winter, Spring. Three recitations each week. General prerequisites must include a course in statics. All instructors.

Dynamics of linear and angular motion from constant forces and forces proportional to displacement; connected bodies; impulse and momentum; combined rotation and translation; work, energy, and power.

610. Mechanics of Fluids. Three credit hours. One Quarter. Autumn, Winter, Spring. Three recitations each week. General prerequisites must include a course in statics. All instructors.

Fluid pressure including stability of simple gravity dams; kinematics and dynamics of fluid flow including orifices, weirs, nozzles, venturis, and vortices; fluid friction; dynamical similarity, non-turbulent flow in pipes, and steady turbulent flow in pipes and uniform open channels; pressure of deviated flow.

702. Advanced Strength of Materials. Three credit hours. Autumn Quarter. Three lectures or recitations each week. General prerequisites must include Mechanics 602. Mr. Folk.

Compound stresses; theories of failure of elastic action; design of thick-walled cylinders; stresses in flat plates by approximate methods and by Grashof's formula; curved beams and hooks; torsion in non-circular sections; unsymmetrical sections.

707. Advanced Dynamics. Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include Mechanics 607. Mr. Ott.

Acceleration, velocity and displacement from variable forces. Vibration, free and forced. Percussion and impact. Dynamic balance. Vibration and whipping of shafts. Gyroscopic motion.

710. Advanced Mechanics of Fluids. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Mechanics 610. Mr. Powell.

A continuation of subject matter of Mechanics 610, including plotting of streamlines and pathlines; Von Karman's theory of pipe friction; unsteady flow in pipes; non-uniform flow in open channels; and the elements of dimensional analysis and dynamic similarity as applied to model testing.

799. Special Problems in Advanced Mechanics. Two to five credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Mechanics 602 and 607, and consent of instructor. All instructors.

This course is intended to give the advanced student an opportunity to pursue special studies not offered in fixed curricula, in such topics as mechanics of earth action, photoelastic analysis, stress analysis by various types of models, balancing and other dynamic problems, advanced theoretical mechanics, and the study of hydraulic models. A student may repeat the course until he has a maximum of fifteen credit hours.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Mechanics. Autumn, Winter, and Spring Quarters.

MEDICAL AND SURGICAL RESEARCH

(See Surgical Research)

MEDICINE

Office, Kinsman Hall

PROFESSOR DOAN, ASSOCIATE PROFESSOR VAN BUSKIRK, AND STAFF

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

732. Preventive Medicine. One credit hour. Spring Quarter. One lecture each week. Mr. Van Buskirk.

The course is designed to emphasize disease prevention. Since the field is so broad and includes a consideration of all diseases, they are discussed under general headings depending upon methods of prevention. During these discussions various factors of hygiene, sanitation and other preventive measures are mentioned only to be more definitely correlated in subsequent lectures. The concluding meetings will deal with the various agencies interested in the educational,

hygienic, sanitary, and social phases, all of which are included in the larger field of public health activities.

Not open to students who have credit for Medicine 635.

750. Principles of Hematology. One credit hour. Winter Quarter. General prerequisites must include Anatomy 624 or its equivalent and the permission of the instructor must be obtained. Mr. Doan and staff.

A seminar and laboratory course meeting every second Monday afternoon from 2 to 5 during the Winter Quarter. The normal human and comparative blood pictures including a study of the normal hematogenic organs will be emphasized, but sufficient pathological material will be introduced to establish the limits for the range of normal. Each student will be expected to select some special phase of the field and develop it thoroughly with an adequate survey of the current literature, to be organized for presentation before the group at some time during the course. Independent work will be encouraged. Limited to a maximum of twenty-five students.

Not open to students who have credit for Medical and Surgical Research 600.

780. Minor Problems. Three to five credit hours. All Quarters. Library, conference and laboratory work. General prerequisites must include adequate preclinical training and satisfactory scholarship in regular required course work. Permission of the Director of the Department is required.

FOR GRADUATES

900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Medical Research. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the basic preclinical sciences, and proof of an interest in and the ability to undertake the selected project. The student may spend a part or all of his time in research work and he must be registered in the Graduate School. Permission of the Director of the Department is required. Mr. Doan and staff.

METALLURGY

Office, 100 Lord Hall

PROFESSORS DEMOREST AND MUELLER, ASSOCIATE PROFESSOR LORD, MR. RAUTIO

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These general prerequisites include fundamental courses in physics and metallurgy.

The following courses do not carry graduate credit for students who received the degree of Bachelor of Metallurgical Engineering from The Ohio State University: 605, 606, 610, 620, 650, 651, 701, 705, 706, 709, 720.

605. Iron and Steel Metallurgy. Three credit hours. Winter Quarter. Three lectures or recitations each week. General prerequisites must include Metallurgy 651. Mr. Demorest, Mr. Rautio.

Lectures and problem work on the preparation of pig iron, open hearth, bessemer and electric steel and malleable cast iron and the rolling and forging of steel shapes. Calculation of furnace charges and application of thermodynamics to the equilibria approached in metallurgical operations.

606. Principles of Metallography. Three credit hours. One Quarter. Autumn and Spring. Two lectures and four hours of laboratory each week. General prerequisites must include two Quarters of college chemistry. Mr. Lord.

An elementary course in physical metallurgy. Study of structures and equilibrium relations of metals and alloys by use of the microscope. Crystalline structure and physical properties of metals and alloys and changes produced therein by temperature. Problems on the quantitative distribution of structural features. Construction and significance of equilibrium diagrams. In the laboratory, metals and alloys are melted and cast and specimens are prepared for microscopic examination to correlate structure with composition and treatment.

610. Non-ferrous Metallurgy. Five credit hours. Spring Quarter. Five recitations each week. General prerequisites must include one year of college chemistry. Mr. Mueller.

Metallurgy and properties of the common non-ferrous metals. The chemical principles of the reduction of base metals from their ores. Refining and preparation for the market from the standpoint of physical and operative metallurgical principles. The igneous solution of impurities and concentration of precious metals in common base metals from the standpoint of theoretical equilibrium diagrams. The common hydro-metallurgical processes for copper, zinc, gold, and silver, and their possible applications to other metals. General principles of electro-metallurgy of the common metals for igneous and hydro-metallurgical applications. The study of slags and their equilibrium diagrams as related to the reduction of ores, refining of base metals and relation of slags to furnace and ladle linings.

620. Principles of Ore Dressing and Coal Cleaning. Five credit hours. Autumn Quarter. Four lectures or recitations and one three-hour laboratory period each week. General prerequisites must include a course in descriptive mineralogy. Mr. Mueller.

An introduction to the field of mineral dressing. Fundamental principles of mineral and coal preparation for economic uses. Principles and design of crushers and grinders. Wet and dry classifiers and screens. Principles of mineral separations by various processes, such as use of jigs, tables, magnetic and electrostatic separators, trough separators and flotation. Principles and equipment used for settling, thickening and filtration of concentrates, trailings and coal. Flow sheets of plants.

650. Pyrometry. Two credit hours. One Quarter. Autumn and Winter. One lecture or recitation and one three-hour laboratory period each week. Mr. Lord.

Lectures, laboratory, and problem work on the calibration and use of resistance thermo-electric, optical, and total radiation pyrometers.

651. Fuels. Three credit hours. One Quarter. Autumn and Winter. Three lectures or recitations each week. Mr. Demorest, Mr. Mueller, Mr. Rautio.

Origin and manufacture of solid, liquid and gaseous fuels. Chemical compositions and variations of fuels. Carbonization and destructive distillation processes. Gasification processes. Thermochemistry and thermodynamics of combustion and gas reactions with much problem work.

665. General Metallurgy. Five credit hours. Spring Quarter. Five lectures or recitations each week. General prerequisites must include two Quarters of college chemistry. Mr. Mueller.

Metallurgy of iron, steel, copper, lead, zinc, gold, silver, aluminium, and magnesium. Chemical and physical principles of the reduction of the metals from their ores, and refining and alloying of these metals. General principles of hydro-metallurgy and electro-metallurgy of these metals. Typical examples studied in detail.

701. Metallography of Iron and Steel. Four credit hours. Winter Quarter. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 606. Mr. Lord.

Physical metallurgy applied to iron-carbon alloys, steels, and cast iron. Continuation of Metallurgy 606 with specific reference to iron-carbon alloys. Iron and steel terminology and conventional methods of heat treatment are studied from the standpoint of equilibrium and structure changes. Laboratory work in the development of the technique of taking photomicrographs of carbon steels in annealed and heat treated condition.

702. Metallography of Special and Alloy Steels. Three credit hours. Autumn Quarter. Two lectures or recitations and one three-hour laboratory period each week. General prerequisites must include Metallurgy 701. Mr. Lord.

A continuation of Metallurgy 701 and introduction into the general subject of alloy steels. Lectures on effects of alloying other than carbon in steels. Special treatments, such as case carburizing and nitriding and the metallographic and structural features and equilibrium relationships involved. Laboratory work in measuring critical and transformation temperatures, practical carburizing, and heat treatment to secure specified structures and physical properties.

705. Metallurgical Construction. Four credit hours. Winter Quarter. Two lectures or recitations and three two-hour laboratory periods each week. General prerequisites must include Metallurgy 651, 605, 720, 610, or 655. Mr. Mueller.

Principles, practice and design of concentrators and coal-washing plants. Study of flow sheets for milling processes; location of plants and accessory equipment. Relation of plants

to climatic and topographic conditions, health hazards and power facilities. Consideration of equipment for various conditions and purposes, labor requirements and housing of same.

706. Metallurgical Construction. Four credit hours. Spring Quarter. Two lectures or recitations and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 705. Mr. Demorest, Mr. Mueller.

Option: continuation of Metallurgy 705 with special reference to operation, control, costs, and handling of materials; or lectures, recitations, and drawing-room practice on the principles, practice, and design of metallurgical furnaces and plants with special reference to refractories and heat transfer.

709. Advanced Fuel Testing and Problems. Four credit hours. Autumn Quarter. Two lectures and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 651. Mr. Demorest, Mr. Mueller.

Problems and advanced laboratory work in fuel and gas testing. Thermodynamics of combustion and fuel production and utilization. Gas distribution and corrosion of pipes.

720. Advanced Ore Dressing. Three credit hours. Winter Quarter. One lecture and two three-hour laboratory periods each week. General prerequisites must include Metallurgy 620. Mr. Mueller.

Design of flow sheets for ore concentration, coal cleaning and non-metallic mineral separation. The general technique of cyanidation of gold ores and other leaching processes and the refinish of the recovered products.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Metallurgy. Autumn, Winter, and Spring Quarters. Mr. Demorest, Mr. Mueller, Mr. Lord, Mr. Rautio.

MINE ENGINEERING

Office, 219 Lord Hall

PROFESSORS NOLD AND O'ROURKE

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The following courses do not carry graduate credit for students who received the degree Bachelor of Mine Engineering from The Ohio State University: 601, 602, 701, 702, 703.

601. Prospecting and Preliminary Operations. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include a course in geology. Mr. O'Rourke.

Prospecting and boring, their geologic and economic interpretation. Supporting excavations and the materials used.

602. Explosives and Rock Work. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include a course in chemistry and general geology.

Explosives, quarrying, tunnelling, shaft sinking, dredging and excavating machinery.

701. Development and Methods of Mining. Four credit hours. Spring Quarter. Four recitations each week. General prerequisites must include Mine Engineering 602. Mr. Nold.

Development, location of openings, methods of mining, etc.

702. Mine Operations. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include Mine Engineering 701, Electrical Engineering 642 and 643. Mechanical Engineering 673 must be taken concurrently. Mr. Nold.

Drainage, haulage, hoisting, ventilation, illumination, mine gases, and explosions.

703. Mine Examinations and Reports. Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include Mine Engineering 702 or 721. Mr. Nold, Mr. O'Rourke.

Mine examinations, estimation of ore reserves, valuation, reports, organization, administration and determination of costs.

721. Petroleum Engineering. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include a course in geology and a course in physics. Mr. O'Rourke.

Prospecting, drilling, and development of oil and gas fields, oil recovery methods.

722. Petroleum Engineering. Three credit hours. Winter Quarter. Two recitations and one two-hour laboratory period each week. General prerequisites must include Mine Engineering 721. Mr. O'Rourke.

Power gathering systems, preparation of crude petroleum for market, storage, transportation. Laboratory work in examining and testing crude petroleum and petroleum bearing rocks.

750. Mine Investigations. Three to ten credit hours. Autumn, Winter, and Spring Quarters. Conference, library, and laboratory work. In addition to the general prerequisites, the consent of the instructor must be obtained. This course may be repeated until the student has accumulated not to exceed twenty-four credit hours. Mr. Nold, Mr. O'Rourke.

a. Study and Investigation of Some Phases of Mine Development and Operation.
b. Study of Mine Ventilation and Laboratory Work with Ventilating Equipment.
c. Study of the Engineering Problems of Petroleum and Natural Gas Exploration, Production, and Transportation.
d. Design of Mines, Mining Plants, or Planning of Petroleum and Natural Gas Field Development.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Mine Engineering. Autumn, Winter, and Spring Quarters. Mr. Nold, Mr. O'Rourke.

Library, conference, laboratory, and field work on some phase of mining or mine operations.

MINERALOGY
Office, 115 Lord Hall

PROFESSOR McCAUGHEY, ASSOCIATE PROFESSOR BRANT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include fundamental courses in crystallography and mineralogy.

601. Advanced Crystallography. Five credit hours. Spring Quarter. Mr. McCaughey.

Study of the thirty-two crystal groups and their representative crystals. Structure of crystals as determined by X-ray analysis. Laboratory practice with the two circle gomometer in the measurement of crystals and in the drawing and projection of crystals.

605. Thermochemical Mineralogy. Three credit hours, Autumn Quarter. Four credit hours, Spring Quarter. Three or four lectures each week. General prerequisites must include an acceptable course in physical chemistry. Mr. McCaughey.

Thermal properties of minerals, their formation and transformation in silicate mixtures.

606. Advanced Thermochemical Mineralogy. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Mineralogy 605. Mr. McCaughey.

Continuation of Mineralogy 605. Formation and solid solution of silicate minerals in multiple component systems.

621. Microscopic Mineralogy. Five credit hours. One Quarter. Autumn and Spring. Two lectures and three two-hour laboratory periods each week. General prerequisites must include a course in descriptive mineralogy and a college course in physics, covering light. Mr. McCaughey, Mr. Brant.

The use of a polarizing microscope in the identification of minerals in fine powder and thin section. Determination of the optical constants of minerals and crystallized substances with the polarizing microscope.

622. Microscopic Petrography. Four credit hours. Winter Quarter. Two lectures and two two-hour laboratory periods each week. General prerequisites must include Mineralogy 621. Mr. McCaughey, Mr. Brant.

Use of the petrographic microscope in the identification of minerals in thin sections of rocks. Microscopic investigation of igneous metamorphic and sedimentary rocks, correlating texture, mineral composition, alteration and geological agencies affecting these.

631. Mineralogical Investigations. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Library, conference, and advanced laboratory work. General prerequisites must include a course in descriptive mineralogy and Mineralogy 621. Mr. McCaughey.

a. **Microscopic Petrography.** Study and investigation of igneous, metamorphic, and sedimentary rocks in thin section.

b. **Soil Mineralogy.** Mineralogical investigation of loose rock, such as soils, sand, and clays.

c. **Applied Microscopic Mineralogy.** Application of the principles of microscopic mineralogy to the determination of melting and transformation temperature of minerals; microscopic study of refractories, ceramic products, and glasses.

d. **X-ray Crystal Analysis.** Practice in the application of X-rays to the study of minerals and crystallized materials. Calculation for and determination of the fine structure of crystals.

***654. X-rays and Crystal Structure.** Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Given in alternate years. Mr. Blake, Mr. McCaughey, Mr. Harris.

This course is designed for those students in physics, chemistry, and mineralogy who intend to do research work in crystal structures and X-ray analysis.

This course is the same as Chemistry 654 and Physics 654.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION." page 40.

950. Research in Mineralogy and Petrography. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory. Mr. McCaughey, Mr. Brant.

MUSIC

Offices, 1, 2, 3, 4 Page Hall

PROFESSORS WEIGEL, LEEDER, DIERCKS, AND M. E. WILSON, ASSISTANT PROFESSORS JONES, THOMAS, DIERKER, HARDY, GILLILAND, McBRIDE, AND KOB, MR. GRUNDMAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Detailed information concerning these prerequisites follows:

Requirements for Admission to Graduate Work in Music

1. One hundred hours of acceptable academic work, including English, Science, History, Psychology, etc.
   (a) Students majoring in Music Education should also have courses in the theory of education and adequate preparation in the field of Music Education.
   (b) Students majoring in the History of Music should also have a reading knowledge of either French or German sufficient for purposes of research.

* Not given in 1940-1941.

2. Seventy hours of the theory of music, including a satisfactory amount of sight-singing and ear-training, harmony, analysis and form, history of music, conducting and instrumentation.
3. Twenty hours of applied music, including
   (a) for majors in Music Education, courses in strings, wood-winds and brass, and a degree of advancement in piano and voice satisfactory to the department;
   (b) for majors in the History of Music, an acquaintance with instrumental literature and performance ability on some instrument (preferably piano) satisfactory to the department.
4. A period of at least one year between the awarding of the bachelor's degree and completion of the requirements for the master's degree, preferably before the beginning of graduate study; this period should be spent in music teaching, and, in the case of majors in music education, must be so spent.

Requirements for the Master of Arts Degree

1. Music Education (General)
   (a) Music—15 hours from the following group, recommended according to the interest and preparation of the student.
   Supervision (612)—3 hours; (613)—3 hours; (647)—1 to 5 hours
   Conducting (642)—3 hours; (643)—3 hours; (648 or 649)—3 to 6 hours
   History and Appreciation (602) 3 hours; (605)—3 hours; (606)—3 hours; (607)—3 hours
   Other courses chosen in consultation with the department
   (b) Music—Minor Problems (650)—5 hours
   (c) Research in Music (950)—10 hours
   (d) Electives in other fields—15 hours
   Under certain circumstances, a part of this requirement may be taken in music
2. Music Education (Instrumental)
   (a) Music—15 hours from the following groups; recommended according to the interest and preparation of the student.
   Instrumental Music (644)—3 hours; (641)—3 hours
   Conducting (642)—3 hours; (643)—3 hours
   Orchestration (631)—3 hours; (632)—3 hours
   Vocal Materials and Methods (624)—5 hours
   History and Appreciation (601)—3 hours; (602)—3 hours; (603)—3 hours; (605)—3 hours; (606)—3 hours; (607)—3 hours
   (b) Music—Minor Problems (650)—5 hours
   (c) Research in Music (950)—10 hours
   (d) Electives in other fields—15 hours
3. In History of Music
   (a) Music—15 hours from the following groups; recommended according to the interest and preparation of the student.
   History of Music (601)—3 hours; (602)—3 hours; (603)—3 hours; (605)—3 hours; 606—3 hours (607)—3 hours
   Music electives, as advised—9 hours
   (b) Music—Minor Problems (650)—5 hours
   (c) Research in Music (950)—10 hours
   (d) Electives in other fields—15 hours

601. The Romanticists. Three credit hours. Autumn Quarter. Three lectures each week. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. M. E. Wilson.

The music of the romantic period in Germany and France.

602. Wagner and the Music Drama. Three credit hours. Winter Quarter. Three lectures each week. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. M. E. Wilson.

Study of the works of Wagner and his contribution to the opera.

603. Modern Music. Three credit hours. Spring Quarter. Three lectures each week. In addition to the general prerequisites, permission of the instructor must be obtained. Mr. M. E. Wilson.

A brief survey of modern developments with special reference to the composers of France and Russia.

***605. History of Choral Music.** Three credit hours. Winter Quarter. Three lectures each week. In addition to the general prerequisites, permission of the instructor must be obtained.

Choral composers and literature with special consideration of the sixteenth and seventeenth centuries.

* Not given in 1940-1941.

606. Chamber Music—Haydn to Brahms. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include permission of the instructor. Mr. M. E. Wilson.

A survey of the chamber music of the classical and romantic periods with performance, analysis, and discussion.

***607. Instrumental Music before Bach.** Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include courses in history and appreciation of music, or permission of the instructor. Mr. M. E. Wilson.

A study of organ and other keyboard compositions and of chamber music and early orchestra writing in Germany, Italy, France, and England in the period 1650 to 1725.

612. Supervision of Music in the Elementary Schools. Three credit hours. Three recitations each week. Spring Quarter. Open to graduate students majoring in music. Other persons of maturity and experience may elect this course by permission of the instructor. Mr. Leeder.

A study of the specific problems of music supervision with special attention given to curriculum construction.

†613. Supervision of Music in Secondary Schools. Three credit hours. Open to graduate students majoring in music. Other persons of maturity and experience may elect this course by permission of the instructor. Mr. Leeder.

This course is planned to meet the needs of supervisors of music in the senior and junior high schools. Special problems in the various phases of school music will be considered.

623. Music Literature for the Elementary School. Five credit hours. Winter Quarter. Five recitations each week. Miss Dierker, Miss Thomas.

Designed to familiarize the student with song and listening material suitable for use in the elementary school. Study of material supplementary to that used in Music 523.

Not open to students who have credit for Music 609.

624. Music Education in the Secondary Schools. Five credit hours. One Quarter. Autumn and Spring. Five recitations each week. Mr. Leeder, Mr. McBride.

Music literature for use in the secondary schools and how to present it. A course for special teachers and supervisors of music.

Not open to students who have credit for Music 610 and 611.

630. Instrumentation. Three credit hours. Spring Quarter. Three recitations each week. Mr. Grundman.

The aim of this course is to familiarize the student with the instruments of the orchestra as regards their history, technical limitations and orchestral use. Scores will be examined and the technique of scoring for small combinations of all instruments will be studied.

631. Orchestration I. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Grundman.

Scoring for brass or woodwind instruments for full band.

632. Orchestration II. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Music 631. Mr. Grundman.

Scoring for stringed instruments, for strings in combination with other instruments, and for full orchestra.

641. The School Band and Orchestra. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Weigel.

Organization and management of bands and orchestras in the elementary school and the junior and senior high school. Instrumental classes, substitution of parts, repertoire, public performance. Observation of bands, orchestras and instrumental classes in the public schools.

642. Elementary Instrumental Conducting. Three credit hours. Winter Quarter. Three recitations each week. Mr. Weigel.

Conducting of music suitable for the junior and senior high school. Problems of presentation, instrumental combinations, reading from score, etc. A syllabus of selected class and ensemble methods, instruction books and orchestra and band literature by grades will be used as a basis for study.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

643. Advanced Instrumental Conducting. Three credit hours. Spring Quarter. Three lectures and drill periods each week. Mr. Weigel.

This course aims to develop the power to interpret the larger forms of orchestral literature and to read from full score; it includes problems of tempo, phrasing, nuance, balance, timbre, and special study of baton technique. Qualified students will be given opportunity to conduct one of the University Orchestras.

†644. Instrumental Problems I. Three credit hours. General prerequisites must include permission of the instructor.

Study of problems encountered in teaching and supervising of music. Additional investigation of the course of study, special programs, the integrated course, organization, etc. Laboratory ensemble groups of high school students will be available for observation.

*645. Instrumental Problems II. Three credit hours. General prerequisites must include permission of the instructor.

Continuation of Music 644 with different materials.

This course may be taken either preceding or following Music 644.

646. Advanced Vocal Conducting. Three credit hours. Winter Quarter. Three recitations each week. Mr. Gilliland.

Organization and rehearsal technique of the accompanied chorus and the *a capella* choir. Practice in conducting the larger forms of choral literature. A syllabus of selected choral works will be used as a basis for study.

†647. Problems in Music Education. One to five credit hours.

Study of the problems encountered in the teaching and supervising of music. Additional investigation of the course of study, special programs, the integrated course, etc.

This course may be repeated for credit at the discretion of the department.

†648. Choral Problems I. Three credit hours. General prerequisites must include the permission of the instructor.

Study of the problems encountered in teaching and supervising of music. Additional investigation of the course of study, special programs, the integrated course, organization, etc. Laboratory ensemble groups of high school students will be available for observation.

*649. Choral Problems II. Three credit hours. General prerequisites must include the permission of the instructor.

Continuation of Music 648 with different materials.

This course may be taken either preceding or following Music 648.

650. Minor Problems. One to five credit hours. All Quarters. In addition to the general prerequisites, the consent of the department must be obtained. All instructors.

Investigation of minor problems in the field of music.

655. Music in Radio Broadcasting. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include the permission of the instructor. Mr. M. E. Wilson.

A discussion of practical problems involved in broadcasting different types of instrumental and vocal solo and ensemble groups and of finding and coaching such groups. Practice in building programs with considerations of appropriate material and sequences.

NOTE: This course is primarily for students not majoring in music. Those who are majoring in this department should take Music 630, 631, and 632 with emphasis on arrangements for radio performance.

656. Principles of Music Learning. Three credit hours. Autumn Quarter. Three recitations each week. Mr. M. E. Wilson.

An analysis of the factors in learning to appreciate and perform music in early childhood and through adult life.

661. Advanced Harmony. Three credit hours. One Quarter. Autumn and Winter. Three recitations each week. Miss Jones, Mr. H. S. Wilson.

Form analysis.

Not open to students who have credit for Music 468.

† Not given during the academic year, 1940-1941.
* Not given in 1940-1941.

662. Counterpoint. Three credit hours. Autumn Quarter. Three recitations each week. Mr. H. S. Wilson.

Simple counterpoint in two and three parts.

Not open to students who have credit for Music 472.

663. Counterpoint. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include Music 662.

Continuation of Music 662. Four-part counterpoint. Florid counterpoint. Combination of species.

Not open to students who have credit for Music 474.

665. Advanced Harmonic Analysis. Three credit hours. Spring Quarter. Three recitations each week. General prerequisite must include Music 661. Miss Jones.

Study of modern harmonic idioms and forms.

666. Teaching of Theory in Secondary Schools. Three credit hours. Autumn Quarter. Three recitations each week. Mr. Kob.

The presentation of a course in sight singing, dictation and harmony in secondary schools. Principles basic to correlation of these subjects and practical lesson plans.

667. Advanced Keyboard Harmony. Three credit hours. Winter Quarter. Three recitations each week. Mr. Kob.

Chromatic modulation, harmonizations at sight of melodies, transposition and improvisation.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Music. Autumn, Winter, and Spring Quarters.

Original investigation of theory and hisory or of practices in the field of specialization. Research is possible under the general heads: Instrumental Aspects of Music Education, Mr. Weigel; Music Education, Mr. Leeder; Piano Methods, Miss Hardy; Vocal Music and Vocal Conducting, Mr. Diercks; History of Music and Musical Aspects of Psychology and Aesthetics, Mr. M. E. Wilson; Music Theory, Miss Jones; Composition, Mr. Grundman.

NURSING

Office, Starling-Loving Hospital

ASSOCIATE PROFESSOR HALL, Director

Students interested in graduate work in nursing must become candidates for the Master's degree in one of the following fields: education, physical education, or psychology. Such students must satisfactorily complete thirty hours of work in the field of specialization chosen and at least fifteen hours in nursing. Only unusually well prepared persons may expect to receive a Master's degree in less than two years. No one will be permitted to take graduate work in nursing who has not both a graduate nurse's diploma and a bachelor's degree from an accredited college.

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

GENERAL AND BASIC

600. Nursing: Minor Problems. One to four credit hours. Autumn, Winter, and Spring Quarters. Permission of the instructor must be obtained.

Investigation of minor problems in the various fields of nursing.

660. Administration in Schools of Nursing. Three credit hours. Winter Quarter. Open by permission of the instructor.

A brief survey of organization of schools of nursing with special emphasis on ward management, and ward teaching, staff education, etc.

MEDICAL NURSING

601. Advanced Psychiatric Nursing. Three credit hours. Spring Quarter. Lectures, discussions, and observations. General prerequisites must include an elementary course in psychiatric nursing and psychology.

An application of the principles of psychiatric nursing to community problems.

630-631-632. Advanced Medical Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include a course in principles of nursing in medical diseases.

An opportunity is provided for advanced study of medical diseases from a nursing point of view, with special emphasis on laboratory tests, nursing procedures, problems in mental hygiene, and problems in health education. A critical study of the current practices in teaching medical nursing will be carried on. Nine hours constitute a unit year's work. Students may enter any Quarter.

633-634-635. Supervised Practice in Medical Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include courses in supervised practice in medical nursing.

An opportunity is provided for advanced, intensive study of medical nursing problems as they relate to patients cared for on the hospital wards as well as to the individual needs of the students enrolled. Nine hours constitute a unit year's work. Students may enter any Quarter.

670-671-672. Advanced Pediatric Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include a course in pediatric nursing.

This course provides an opportunity for advanced study in pediatric nursing with emphasis on diseases of infancy and childhood as they relate to problems in health education and child development, as well as methods of teaching. Nine hours constitute a unit year's work. Students may enter any Quarter.

673-674-675. Supervised Practice in Pediatric Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include an elementary course in supervised practice in pediatric nursing.

An opportunity is provided for intensive study of pediatric nursing problems as they relate to patients cared for on the hospital wards with emphasis on the analysis of pediatric nursing procedures, milk laboratory problems, and play programs for convalescent children. Nine hours constitute a unit year's work. Students may enter any Quarter.

SURGICAL NURSING

640-641-642. Advanced Surgical Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include courses in the principles of nursing in surgical conditions, in diseases of the eye, ear, nose, and throat, and in surgical specialties.

This course provides an opportunity for advanced study in surgical nursing with special emphasis on building nursing procedures, problems in mental hygiene, and health education, as well as a critical evaluation of the methods of teaching. Nine hours constitute a unit year's work. Students may enter any Quarter.

643-644-645. Supervised Practice in Surgical Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include elementary courses in supervised practice in surgical nursing.

Opportunity is provided for intensive study of problems in surgical nursing as they relate to patients cared for on the hospital wards with emphasis on surgical nursing technics, including operating room technic. Nine hours constitute a unit year's work. Students may enter any Quarter.

OBSTETRICAL NURSING

650-651-652. Advanced Obstetrical Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include a course in principles of nursing in obstetrics.

This course provides an opportunity for advanced study in obstetrical nursing with special emphasis on the role of the nurse in the labor room, problems in postpartum care and nursery routines, as well as a critical evaluation of methods of teaching in this area. Nine hours constitute a unit year's work. Students may enter any Quarter.

653-654-655. Supervised Practice in Obstetrical Nursing. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include a course in supervised practice in obstetrical nursing.

Opportunity is provided for an intensive study of obstetrical nursing problems as they relate to patients cared for on the hospital wards with emphasis on postpartum care, health education and nursing procedures. Nine hours constitute a unit year's work. Students may enter any Quarter.

PUBLIC HEALTH NURSING

602. Principles of Public Health Nursing. Five credit hours. One Quarter. Autumn and Winter. Three lectures and two hours to be arranged each week.

A study of the history and development of public health nursing, together with a critical evaluation of the aims, objectives, and underlying principles involved.

Not open to students who have credit for Public Health 602.

603. Supervised Practice in Public Health Nursing. Seven credit hours. One Quarter. Autumn, Winter, Spring. Open only to students in Nursing or by permission of the instructor. General prerequisites must include Nursing 602.

Field experience is arranged in cooperation with the Instructive District Nursing Association. The program is general and includes all types of public health nursing.

604. Organization and Administration of Public Health Nursing. Five credit hours. One Quarter. Winter and Spring. Lctures and field work. Hours to be arranged. General prerequisites must include Nursing 602 or permission of the instructor.

A study of the organization and administration of public health nursing in official and non-official agencies in the rural, urban, and state public health nursing fields as well as a critical evaluation of methods of individual and group teaching.

Not open to students who have credit for Public Health 404 and 608.

605. Social Case Work Problems. Three credit hours. Autumn Quarter. Open only to undergraduate students in Nursing who have senior standing and to graduate students.

Relationship of the public health nurse to social case work agencies. Elements of social case work.

606. Social Case Work Problems (Field). Three credit hours. One Quarter. Autumn, Winter, Spring. Open only to students in Nursing. General prerequisites must include Nursing 605.

Supervised practice in social case work problems as presented in Nursing 605.

OPERATIVE DENTISTRY

Office, Hamilton Hall

PROFESSORS BOTTENHORN, SNYDER, JONES, KITCHIN, AND HEBBLE, ASSOCIATE PROFESSORS JONES, STROSNIDER, AND STARR, ASSISTANT PROFESSOR WILTBERGER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include adequate preparation in technical courses concerned.

701-702-703. Minor Problems in Operative Dentistry. One to three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include adequate preparation in technical courses concerned.

Students will have assigned to them special problems in Operative Dentistry.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include adequate preparation in technical and practical courses in operative dentistry.

950. Research in Operative Dentistry. Autumn, Winter, and Spring Quarters.

Research relating to and found in the various endeavors concerning treatment and restoration to normal condition of teeth and their contiguous parts.

PATHOLOGY

Office, 310 Hamilton Hall

PROFESSORS VON HAAM AND SPOHR (EMERITUS), ASSOCIATE PROFESSOR REINHART, ASSISTANT PROFESSOR DAVIDSON, MR. SHINOWARA, MISS MOORHEAD, MR. CRYNES, MR. ROTHERMICH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Courses 603-626 inclusive are open only to students who are doubly registered in the College of Medicine and the Graduate School, to the extent of fifteen Quarter hours.

603. Clinical Pathology. Three credit hours. Winter Quarter. Two lectures and four laboratory hours each week. General prerequisites must include Bacteriology 641-642 and Physiological Chemistry 601-602. Mr. Reinhart, Mr. Shinowara, Miss Moorhead.

Sputum, urine, spinal fluid, gastric contents, feces, animal parasites and ova, transudates and exudates, blood cultures, blood typing and matching, miscellaneous examinations.

604. Clinical Pathology. Three credit hours. Spring Quarter. Two lecture and four laboratory hours each week. General prerequisites must include Bacteriology 641-642 and Physiological Chemistry 601-602. Mr. Reinhart, Mr. Shinowara, Miss Moorhead.

Blood, a study of unstained and stained specimens. Special blood pathology. Blood chemistry and functional tests. Sero-diagnostic methods.

616-617-618. Research in Clinical Pathology. Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Pathology 603-604. Mr. Reinhart, Mr. Shinowara, Miss Moorhead.

Study of new methods and tests on materials collected in the hospital wards and out-patient department.

624. General Pathology. Five credit hours. Autumn Quarter. Three lecture and six laboratory hours each week. Mr. von Haam and staff.

Detailed study of degenerative, circulatory, and inflammatory lesions. Tumor pathology.

625. Special Pathology. Five credit hours. Winter Quarter. Three lecture and six laboratory hours each week. General prerequisites must include Pathology 624. Mr. von Haam and staff.

Pathology of the circulatory, respiratory, and gastro-intestinal systems.

626. Special Pathology. Five credit hours. Spring Quarter. Three lecture and six laboratory hours each week. General prerequisites must include Pathology 625. Mr. Davidson and staff.

Pathology of the genito-urinary, reproductive, endocrine, reticulo-endothelial, nervous, and skeletal systems.

653-654. Clinical Pathology. Three credit hours. Winter and Spring Quarters. One lecture and four laboratory hours each week. General prerequisites must include acceptable courses in bacteriology and chemistry. Mr. Reinhart, Mr. Shinowara, Miss Moorhead.

A study of the changes in the blood, secretions, serums, and exudates of the body brought about by disease.

661. General Pathology. Five credit hours. Autumn Quarter. Three lecture and six laboratory hours each week. Mr. von Haam and staff.

Detailed study of degenerative, circulatory, and inflammatory lesions. Tumor pathology.

662. Special Pathology. Five credit hours. Winter Quarter. Three lecture and six laboratory hours each week. General prerequisites must include Pathology 661. Mr. von Haam and staff.

Pathology of the circulatory, respiratory, and gastro-intestinal systems.

663. Special Pathology. Five credit hours. Spring Quarter. Three lecture and six laboratory hours each week. General prerequisites must include Pathology 662. Mr. Davidson and staff.

Pathology of the genito-urinary, reproductive, endocrine, reticulo-endothelial, nervous, and skeletal systems.

725. Surgical Pathology. One credit hour. Autumn Quarter. One lecture each week. Mr. Crynes.

A course correlating clinical symptomatology with the pathology of specimens removed by major chest and abdominal surgery.

726. Medical Pathology. One credit hour. Winter Quarter. One lecture each week. Mr. Rothermich.

A course correlating the symptomatology of internal diseases with organ pathology.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include adequate courses in basic pre-clinical sciences.

950. Research in Pathology. Autumn, Winter, Spring, and Summer Quarters. General prerequisites must include accepted courses in basic pre-clinical sciences. Mr. von Haam, Mr. Reinhart, and staff.

PHILOSOPHY

Office, 320 University Hall

PROFESSORS LEIGHTON, CHANDLER, AVEY, AND EVANS, MR. REITHER, MR. WATERS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Courses bearing numbers 601 to 650 are historical; courses bearing numbers 651 to 700 are systematic.

601. Ancient Philosophy. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Mr. Chandler.

The development of philosophical thought from the Greeks to the Middle Ages. Most of the time is devoted to Greek Philosophy. A natural continuation of this course will be found in Philosophy 602; a more specialized treatment of medieval philosophy will be found in Philosophy 609.

602. Modern Philosophy to Kant. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Mr. Chandler.

The development of philosophical thought from the Renaissance to the end of the eighteenth century. A natural continuation of this course will be found in Philosophy 603.

603. Philosophy since 1800. Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include Philosophy 602. Mr. Leighton.

The development of philosophical thought from the beginning of the nineteenth century to the present. Special attention is given to the relations between philosophy, social movements, and literature.

604. Recent and Contemporary Philosophy. Three credit hours. Autumn Quarter. General prerequisites must include either Philosophy 601, 602, 603, or 656. Mr. Leighton.

Philosophical movements of the day and their relation to current social problems.

606. American Philosophy. Three credit hours. Winter Quarter. General prerequisites must include ten hours in philosophy. Mr. Evans.

A survey of the chief philosophical standpoints which have entered into the constitution of the American mind since colonial times; the life and works of the thinkers whose theories are considered.

608. Philosophy and Poetry. Three credit hours. Spring Quarter. Given in alternate years. General prerequisites must include ten hours in philosophy. Mr. Chandler.

A discussion of Lucretius, Dante's *Divine Comedy* and Goethe's *Faust*, for the light they throw on the history of thought and the nature of poetic excellence.

***611. Origin and Development of Religious Ideas.** Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Mr. Avey.

A general survey of the fundamental ideas of the most important historical religions, including primitive beliefs: Brahmanism; Buddhism; Confucianism; Mohammedanism; Judaism; the various forms of Christianity.

***623. Representative Greek Philosophers.** Five credit hours. Winter Quarter. General prerequisites must include Philosophy 601. Mr. Waters.

A study of the more important Platonic dialogues.

625. Representative Modern Philosophers. Five credit hours. Winter Quarter. Given in alternate years. General prerequisites must include Philosophy 602. Mr. Reither.

A few representative works of classic thinkers of the period from Bacon and Descartes to Schopenhauer will be selected for intensive study.

†628. The Platonic Tradition in European Thought. Five credit hours.

A study of certain dialogues of Plato and of their influence upon aspects of Neo-Platonism, Christianity, the Florentine Academy, the Cambridge Platonists, the English poets.

***649. Formal Logic.** Five credit hours. Spring Quarter. General prerequisites must include a course in logic or consent of the instructor. Mr. Waters.

A study of the essentials of Aristotelian Logic; immediate and mediate inference (syllogism, hypotheticals, alternatives, etc.). The development into symbolic logic.

652. Philosophy of Science. Three credit hours. Spring Quarter. Given in alternate years. General prerequisites must include either five hours of philosophy and ten hours of science, or twenty hours of science. Mr. Waters.

A study and critical discussion of a few general interpretations of the methods and basic assumptions of the natural and social sciences.

653. Philosophy of Religion. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include five hours of philosophy. Students are advised to take Philosophy 611 as a background for this course. Mr. Avey.

The psychical and social nature of religion; a systematic examination of the fundamental religious conceptions—the idea of God in relation to the idea of the world, the idea of man, and the problem of human destiny.

656. Principles of Social Ethics. Three credit hours. Autumn Quarter. General prerequisites must include one of the following: five hours of philosophy or Psychology 621, Education 603 or 632, or ten hours of social science. Mr. Chandler.

Systematic development of a philosophy of human values, and its application to the chief forms and activities of civilized life—industrial and economic activities, the state, education, culture, and religion. The philosophies of Fascism, Nazism, Communism, and Liberal Democracy.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

660. Minor Problems. Two to ten credit hours. Autumn, Winter, and Spring Quarters. All instructors.

Investigation of minor problems in the history of philosophy or systematic philosophy. Students ordinarily expect to take this course for from two to five credit hours, but honors students may receive credit up to ten hours.

Topics for special study may be chosen from the following fields: ethics, logic, metaphysics, history of philosophy, religion (including Hebrew ideas and Christian origins), aesthetics.

661. Metaphysics of Knowledge and Nature. Three credit hours. Winter Quarter. Given in alternate years. General prerequisites must include two of the following: Philosophy 601, 602, 603, 623, 625. Mr. Leighton.

A systematic consideration of the nature of scientific method and the scientific conception of nature in its bearings on the problems of man.

662. Metaphysics of Personality and Values. Three credit hours. Spring Quarter. Given in alternate years. General prerequisites must include two of the following: Philosophy 601, 602, 603, 623, 625. Philosophy 661 will ordinarily precede this course. Mr. Leighton.

A systematic consideration of the nature of the self and society, the problem of values, and the problem of the meaning of existence as a whole.

665. Philosophy of History. Three credit hours. Spring Quarter. General prerequisites must include ten hours in philosophy and ten hours in the social sciences. Mr. Leighton.

A discussion of the place of history in the system of human knowledge, the humanistic significance of the historical attitude, the concepts of civilization, culture, development, and progress. The aim of the course is to formulate a philosophy of culture.

†670. Pragmatism. Three credit hours. General prerequisites must include ten hours of education or philosophy. Class enrollment limited to fifty. Mr. Bode, Mr. Avey.

A study of the psychological motives and the historical setting from which pragmatism developed; the application of the point of view to the problems of knowledge, of conduct, of education, and religion. Special emphasis will be placed upon the writings of Dewey.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These general prerequisites include acceptable foundation courses either in psychology, logic and ethics, or in the history of philosophy, and in some cases in all of these subjects.

Prospective students are likewise strongly recommended to prepare for graduate work in this department by taking related courses in other departments. Psychology is regarded as related to all courses in philosophy. The following are suggested as related courses in other departments. For students of logic and metaphysics: mathematics, and natural sciences, especially general and theoretical physics, general and historical chemistry, and evolution (Zoology 509); for students of ethics and the philosophy of religion: sociology, politics, and history; for students of the history of philosophy: European history, and the history of Greek, German, English, and French literatures. Students proposing to specialize in philosophy must previously have completed the equivalent of at least eighteen Quarter-credit hours in philosophy and psychology. In case of students whose main interest is in ethics, two Quarters' work in the principles of sociology may be accepted in partial fulfillment of the above requirement.

Candidates for the Ph.D. degree in Philosophy are required to present themselves for general examinations in the elements of the entire subject, and also for more intensive examinations on six of the following subdivisions:

1. Greek philosophy through Aristotle
2. Graeco-Roman philosophy from the death of Aristotle to Plotinus
3. Modern philosophy through Kant
4. Modern philosophy from Kant to the present (including Kant)
5. Ethics
6. Social and Political Philosophy
7. Methodology of the Sciences
8. Symbolic logic
9. Theory of knowledge
10. Metaphysics
11. Aesthetics
12. History and Philosophy of religion

The candidate's choice of topics shall be made in consultation with the department and shall be relevant to the topic of his thesis.

† Not given during the academic year, 1940-1941.

Philosophy 661, 662, or their equivalent, are required of all candidates for the Doctor's degree.

801. Seminar in Systematic Philosophy. Three credit hours. Autumn Quarter. Mr. Chandler.

802. Seminar in Systematic Philosophy. Three credit hours. Winter Quarter. Mr. Leighton.

803. Seminar in Systematic Philosophy. Three credit hours. Spring Quarter. Mr. Avey.

950. Research in Philosophy. Autumn, Winter, and Spring Quarters. Mr. Leighton, Mr. Chandler, Mr. Avey.

PHONETICS

(See Speech)

PHOTOGRAPHY

Office, 4 Brown Hall

ASSISTANT PROFESSOR DAVIS, MR. REBER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

625. Scientific Photography. Three credit hours. Winter Quarter. Two lectures and recitations and two two-hour laboratory periods each week. General prerequisites must include a year of elementary or general chemistry and in addition at least twenty Quarter hours in a scientific major. Mr. Davis, Mr. Reber.

This course is designed for students of physics, chemistry, astronomy, biology, and other sciences who need a knowledge of the principles and techniques of photography as an aid to their scientific work. Special attention is given to the nature of photographic processes, characteristics of photographic materials and the applications of photography to science. The laboratory exercises will be selected as far as possible to meet the needs of individual students.

Not open to students who have credit for Photography 725.

650. Advanced Photography. Three credit hours. Winter Quarter. Two lectures and two three-hour laboratory periods each week. General prerequisites must include a course in photographic processes or Photography 625 or 725. Mr. Davis, Mr. Reber.

A continuation of Photography 511 or 625, dealing mainly with projection printing, portraiture, special effects, photo-engraving, lens testing, color photography, miniature camera work and motion pictures.

Not open to students who have credit for Photography 750.

699. Minor Problems in Photography. Three to five credit hours. Autumn and Winter Quarters. Conference, library and laboratory work. General prerequisites must include a course in photographic processes or Photography 625 and 650, and fifteen Quarter hours of elementary or general chemistry and/or physics and consent of the instructor. This course may be repeated until the student has accumulated not to exceed ten Quarter hours of credit. Mr. Davis.

This course is designed to permit a properly qualified student to avail himself of the library and laboratory facilities of the department for adding to his knowledge and techniques in some subject in photography and for carrying out minor investigations.

PHYSICAL EDUCATION

MEN'S DIVISION

Office, 124 Physical Education Building

PROFESSORS ST. JOHN, OBERTEUFFER, AND SCHMIDT, ASSOCIATE PROFESSORS ASHBROOK, DUFFEE, AND STALEY, ASSISTANT PROFESSORS HOWARD AND LARKINS

WOMEN'S DIVISION

Office, 201 Pomerene Hall

PROFESSOR PALMER, ASSOCIATE PROFESSORS SUMPTION AND BOYNTON, ASSISTANT PROFESSORS GILMAN, STEIN, AND WATSON, MISS YOST

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

†601. Principles of Football Coaching and Management (Men). Three credit hours. General prerequisites must include coaching experience.

A course for advanced students of football. The course will consider the principles underlying various types of football strategy, the designing of plays, methods of teaching and controlling players; also, special problems of management, such as those connected with selecting, handling equipment, and making trips.

615. Problems in Intramural Sports (Men and Women). Two credit hours. Spring Quarter. Two class meetings each week. Mr. Staley.

A critical analysis of intramural sports programs with a view to their justification from the standpoint of objectives, age level and contribution to the general welfare of the students participating. Problems of policy and administration of programs on the elementary, secondary, and college levels will be studied. Lectures, readings, reports, and discussions.

621. Principles of Physical Education (Men and Women). Five credit hours. Winter Quarter. General prerequisites must include ten hours of physical education or equivalent biological training and courses in the theory and practice of physical education, or equivalent. Mr. Oberteuffer.

The nature of physical education, especially in relation to overlapping fields, such as health education and community recreation, and to education in general. A critical analysis of various objectives advanced; a review, with applications to physical education of modern conceptions of education and of modern principles in psychology and physiology.

625. Tests and Measurements in Physical Education (Men and Women). Three credit hours. Winter Quarter. Two lectures and one two-hour laboratory period each week. Mr. Ashbrook.

A critical study of various specific tests and types of tests, including those designed to measure neuromuscular capacity or proficiency. Among the tests studied will be those of Schneider, Brace and Rogers, and a number of efficiency standards in use in public school systems and elsewhere.

630. Individual Physical Education (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include an elementary course in individual physical education. Section for men, Mr. Howard; section for women, Miss Gilman.

Making a physical education program meet the needs of handicapped individuals, fundamental principles in the selection and adaptation of activities in corrective procedures, abnormal physical conditions that come to the care or attention of the physical educator, methods of examining and determining individual needs, activity programs of both formal and informal character to meet the needs in schools and colleges, will be the problems dealt with in this course. The problems will be discussed in the light of modern objectives of education and particularly individual physical education. There will be lectures, recitations, demonstrations, term projects, and occasional trips to various orthopedic hospitals for observation purposes.

631. Dance Composition (Men and Women). Three to five credit hours. Winter Quarter. General prerequisites must include a course in elementary

† Not given during the academic year, 1940-1941.

interpretative dancing. Permission of instructor must be obtained. Miss Watson.

Lectures, readings, and discussions of the dance as an art. The study of body movement as an expressive medium based upon analysis of old and new dance forms. Practice in program-making and opportunity to assist in recital production.

632. Rhythmic Analysis (Men and Women). Three credit hours. Spring Quarter. Two lectures and three laboratory meetings each week. General prerequisites must include one Quarter of advanced dancing, elementary rhythmic analysis, elementary interpretative dancing, or the equivalent. Miss Watson.

A study of the rhythmic pattern of body movement in more complex dance forms; the kinesthetic theory of rhythmic perception, and the development of a discriminating sense of rhythmic values as carried into individual and group composition.

635. Current Problems in Physical Education for Girls and Women (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Physical Education 621 or the quivalent. Miss Palmer.

A discussion of outstanding problems in the organization of a sports program for girls and women: policies, activities, types of competition, point systems, awards, and athletic associations.

641. Personal Health Problems (Men and Women). Three credit hours. Autumn Quarter. Three lectures and recitations each week. Mr. Oberteuffer.

A study of the problems of living as they involve the health of the adult. Problems of the adjustment of the individual to conditions of rural and urban life. An informational and problems course. Serves also as a basic subject matter course for advanced study in health education.

643. Principles of Health Education (Men and Women). Three credit hours. Spring Quarter. Three lectures each week. Mr. Oberteuffer.

A basic survey of educational opportunities in health found in the various aspects of school life. Principles underlying the school health program. Survey of available teaching materials used in the classroom. Includes a study of official and non-official health agencies and their bearing upon the school health program. No discussion of the techniques of teaching.

644. The Teaching of Health in Secondary Schools and Colleges (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Physical Education 643 or the equivalent. Mr. Oberteuffer.

How to teach and what to offer in hygiene or health classes. Discussions of the methods and subject matter used in presenting hygiene to students. Includes a study of the opportunities for integration of health material with other subjects of the organized curriculum.

645. Administrative Interrelationships of School Health Education (Men and Women). Three credit hours. Winter Quarter. Three class meetings each week. General prerequisites must include Physical Education 643. Miss Palmer.

This course proposes to continue the orientation of the student in matters of health education, with particular reference to public and organizational relationships. Problems of community preschool care, the follow-up work, community problems of programs for tuberculous children, crippled children, mental hygiene services. The relationships between the school personnel and medical, clinical, and nursing services in the community.

***646. Professional Preparation of Teachers in Physical and Health Education (Men and Women).** Three credit hours. Autumn Quarter. Three class meetings each week. Permission of the instructor must be obtained.

The principles underlying the professional training of teachers in physical and health education; curriculum construction; selection of candidates; supervised teaching; staff personnel; problems pertaining to professional students.

647. The Teaching of Physical Education (Men). Three credit hours. Winter Quarter. Two lectures and three laboratory periods each week. Physical Education 621 must be included in the general prerequisites or taken concurrently. Mr. Ashbrook.

Lectures, discussions, demonstrations, and practice. Selection and organization of subject matter in different types of physical education classes. Techniques of instruction. Use of equipment. Modification of subject matter and procedure to meet varying school and community conditions.

* Not given in 1940-1941.

648. The Teaching of Physical Education (Men). Three credit hours. Spring Quarter. Two lectures and three laboratory periods each week. Physical Education 621 must be included in the general prerequisites or taken concurrently. Mr. Ashbrook.

A continuation of Physical Education 647.

649. Camping: Its Organization and Administration (Men and Women). Three credit hours. Spring Quarter. Lectures, readings, and field demonstrations. Three lectures each week. Occasional Saturday mornings will be scheduled for field trips. Prerequisite for Social Administration students, Sociology 645. Prerequisite for physical education students, ten hours of sociology, and courses in the theory and practice of physical education. Mr. Staley, Miss Yost.

The organization and direction of camps, particularly summer camps for boys and girls. Special attention is given to the social and educational program for adolescents. Designed for those preparing for the direction of boys' and girls' work. Practical demonstrations in camping will be included.

Not open to students who have credit for Social Administration 649.

651. Minor Problems in Physical Education (Men and Women). One to four credit hours. Autumn, Winter, and Spring Quarters. Permission of the adviser must be obtained. The staff.

Investigation of minor problems in the field of physical and health education.

682. Organization and Administration of Physical Education (Men and Women). Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include Physical Education 621 or equivalent. Miss Palmer, Miss Sumption.

The policies in the organization and administration of the Physical Education program; classification of students, staff, teaching load, time schedule, finances, etc. The administration of the Physical Education plant; gymnasium, locker rooms, swimming pool, equipment, records. Intra-school relationships.

685. Prevention and Care of Injuries (Men). Three credit hours. Autumn Quarter. Three lectures each week. Mr. Duffee.

A consideration of the methods of prevention and care of injuries occurring in physical education and competitive sports. The course also includes a discussion of the conditioning of men for athletic contests.

691. Kinesiology (Men and Women). Three credit hours. Autumn Quarter. Four lecture-laboratory periods each week. General prerequisites must include acceptable courses in human anatomy and physiology. Section for men, Mr. Howard; section for women, Miss Stein.

The science of bodily movement. Basis for: prescription of activities in individual physical education; identification of common athletic injuries; form and style in athletic performance; analysis of coordination in sports, gymnastics, and ordinary activities of daily life.

692. The School Health Service (Men and Women). Three credit hours. Winter Quarter. Three lectures each week. Mr. Duffee.

A consideration of the problems in connection with the health of the school child and teacher. Discussions and reports relating to medical inspection, physical examinations, symptoms and control of common school diseases, malnutrition, and the health environment of the school child. Observations in schools of physical examinations, systems of record keeping, follow-up services, malnutrition, and of the classes for the handicapped will be made.

NOTE: For course in the History of Physical and Health Education, see the Department of Education, Course 642.

NOTE: For course in the Physiology of Exercise see the Department of Physiology, Course 640.

NOTE: For course in the Administration of Physical and Health Education see the Department of Education, Course 731.

NOTE: For course in Health Education for Teachers see the Department of Education, Course 664.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

801. Seminar in Health Education (Men and Women). Two credit hours. Autumn Quarter. The staff.

Discussion sections will be arranged for small groups according to school and institutional levels.

802. Seminar in Physical Education (Men and Women). Two credit hours. Winter Quarter. The staff.

803. Seminar in Athletics (Men and Women). Two credit hours. Spring Quarter. The staff.

805. Physical Education in Schools and Colleges (Men and Women). Three credit hours. Autumn Quarter. Three lectures and discussions each week. General prerequisites must include Physical Education 621 or its equivalent. Mr. Oberteuffer.

An analysis of existing school and college programs considered in the light of acceptable practices in school administration. Will involve some case studies with summaries drawn in terms of principles. Arranged for students with teaching experience.

810. Scientific Studies in Physical Education (Men and Women). Three credit hours. Autumn Quarter. Three lectures each week. Mr. Ashbrook.

A survey and evaluation of published reports of research in the field of physical education.

816. Problems in Interscholastic and Intercollegiate Athletics (Men and Women). Three credit hours. Spring Quarter. Three lecture and recitation hours each week. Mr. Oberteuffer.

The relation of athletics to education; problems of athletic organization; eligibility; finance; current trends and developments in management and purpose; public relations.

820. Problems in Health Education (Men and Women). Three credit hours. Winter Quarter. Three lecture and recitation periods each week. Mr. Oberteuffer.

Problems of the relation of medicine to education; the physician in the school; legal aspects of the school health program; social medicine; trends and developments in mental and social hygiene. Individual and group readings and forum discussions.

823. Organic Science as Applied to Physical Education and Health Education. Five credit hours. Winter Quarter. General prerequisites must include ten hours of physiology, ten hours of chemistry, and ten hours of biology or its equivalent. Mr. Ashbrook.

This elective course has been planned for graduate students who need a systematic review of the fundamental sciences underlying physical and health education. It consists of an intensive series of lectures and demonstrations in the laboratory, supplemented by extensive reading. The purpose of the course will be to develop the integration of the sciences—chemistry, biology, anatomy, physiology—to the fields of physical education and health education.

826. Supervision of Physical and Health Education (Men and Women). Four credit hours. Autumn Quarter. Three lectures each week. Mr. Ashbrook.

A study of the opportunities and problems of the supervisor in city, county, and state school systems; the relations of the supervisor to the superintendent and to the teacher; rating teachers; methods of assisting teachers. Separate units of the course will consider supervisors problem unique to the sexes.

830. Survey and Clinical Practice in the Care of the Physically Handicapped (Men and Women). Three credit hours. Winter Quarter. Two lectures and three laboratory periods each week. General prerequisites must include Physical Education 630, Physiology 640, or equivalent. Consent of instructor must be obtained. Advised background in child psychology and abnormal psychology. Mr. Howard, Miss Gilman.

Observation of orthopedic diagnosis and surgery, physiotherapy methods in various educational and medical centers. Clinical experience under the supervision of the orthopedic surgeon in the after care of infantile paralysis, spastic paralysis, post-operative, scoliosis, and social hygiene. Individual and group readings and forum discussions.

Not open to students who have credit for Physical Education 652.

855. Public Recreation: Its Organization and Administration. Three credit hours. Spring Quarter. Mr. Batchelor.

Consideration of public provision for the use of leisure with particular reference to methods of organization and administration of playgrounds, community centers, and school centers.

The content of this course will be arranged by consultation between the Departments of Social Administration and Physical Education.

950. Research in Physical and Health Education (Men and Women). Autumn, Winter, and Spring Quarters. The staff.

PHYSICS AND ASTRONOMY

PHYSICS

Office, 107 Mendenhall Laboratory

PROFESSORS ALPHEUS W. SMITH, BLAKE, LANDE, AND THOMAS, ASSOCIATE PROFESSORS ALVA W. SMITH, GREEN, POOL, AND NIELSEN, ASSISTANT PROFESSORS HEIL, ZUMSTEIN, KNAUSS, HESTHAL, AND SHORTLEY, MR. MORE, MR. GAERTTNER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These general prerequisites include fundamental courses in physics and mathematics.

608. Advanced Electricity. Four credit hours. Autumn Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Shortley.

Introduction to electrostatics, magnetostatics, magnetic field of a current, electromagnetic induction, alternating currents, oscillating circuits.

609. Molecular Physics and Heat. Four credit hours. Autumn Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. More.

Introduction to the fundamental ideas of thermodynamics and statistical mechanics with an extended discussion of the kinetic theory of gases; equation of state of ideal and real gases; transfer phenomena; Brownian motion; classical and modern theories of specific heats; temperature radiation; thermal excitation of spectra.

610. Conduction of Electricity through Gases. Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Heil.

An introductory course on the passage of electricity through gases and evacuated tubes, ionic velocities, photo-electricity, cathode rays and positive rays, radioactivity, elementary introduction to electron theory of matter, etc.

612. Periodic and Transient Electric Currents. Four credit hours. Spring Quarter. Three lectures and recitations and one two-hour laboratory period each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Alva Smith.

Transient and stationary states in electrical circuits containing impulsive or periodic electromotive forces treated by the methods of differential equations and vector analysis; periodic and aperiodic currents in single circuits with resistance, inductance and capacity in series or parallel; coupled circuits; resonance phenomena; damped oscillations; theory of alternating current bridge measurements; pulsating currents; Fourier's analysis of periodic non-sinusoidal wave forms; electromagnetic radiation.

615. Introduction to Nuclear Physics. Four credit hours. Winter Quarter. General prerequisites must include calculus and one year of college physics. Mr. Pool.

Review of recent experimental methods and data on transmutation of the elements by bombardment with protons, deutons, neutrons, and alpha rays; artificial radioactivity; detection of nuclear disintegration products.

616. Advanced Physical Laboratory. Three to twenty-four credit hours. All Quarters. Two three-hour laboratory periods each week. General prerequisites must include one year of college physics. Mr. Heil.

This course is intended to give the advanced student in science practice in precise physical

measurements, involving the use of high grade mechanical, optical, electrical and thermal instruments.

The work undertaken will be elected from the following topics:

a. **Mechanics and Heat.** Exact measurements involving determinations of elasticities of solids, moments of inertia, torsional rigidity, torsional hysteresis "g" by physical pendulum, coefficients of viscosity, density of gases and vapors, hygrometry, specific heats, heat values of gases, thermo-electromotive forces, etc.

b. **Advanced Optical Measurements.** Exact determinations of indices of refraction by means of spectrometers, wave lengths by means of ruled gratings and interferometers, dispersion, polarization, absorption, analysis of spectra, etc.

c. **Advanced Electrical Measurements.** Exact measurements of currents, resistances, electromotive forces, magnetic permeability, capacity and inductance, transient phenomena involving the determination of time constants of circuits; fundamental alternating current measurements; the use of the oscillograph in the study of alternating and transient currents.

d. **Advanced Measurements in Ionization and Radioactivity.** Use of electrometers and electroscopes for exact measurements of currents in gases, saturation currents, discharge of electricity and ionizing properties of radioactive materials, absorption of radiation; ionizing properties of flames and incandescent solids; characteristic curves of two and three electrode tubes and applications, photo-electricity, etc.

e. **Pyrometry and High Temperature Measurements.** Thermo-electric pyrometers, resistance thermometers, optical pyrometers, total radiation pyrometers, temperature recorders and controlling devices, transition points and thermal analysis at high temperatures.

f. **Acoustics.** Measurements on characteristics of speech sounds, limits of audition, masking effect of different sounds, binaural beats, acuity of hearing, acoustic filters, reflection and absorption of sound, reverberations, resonance in tubes and pipes, velocity of sound in different media.

g. **Spectroscopy.** Study of characteristics and measurement of wave lengths of visible, ultraviolet and infra-red spectra.

Any one of the above topics may be selected during any Quarter with the exception of topic (d), which is offered only during the Winter Quarter.

A student may repeat this course until he has obtained a maximum of twenty-four credit hours. Only three credit hours may be taken during any Quarter except during the Summer Quarter, when six credit hours may be obtained. A student may accumulate not more than six credit hours in any *one* of the above topics.

†617. **Spectroscopic Instruments and Methods.** Four credit hours. Winter Quarter. Three lectures and recitations and one two-hour laboratory period each week. General prerequisites must include three Quarters of college physics and calculus must be taken concurrently. Mr. Zumstein.

Mirrors, lenses, gratings, interference, diffraction, plane waves, standing waves, polarization, and flow of energy; characteristics and uses of different types of spectrographs for visible, ultraviolet and infra-red regions of the spectrum; interferometers, spectrophotometers, and microphotometers; spectroscopic and photometric methods and their technical applications; light sources for spectroscopy and photometry; elementary survey of spectroscopic data.

618. **Modern Spectroscopy.** Four credit hours. Spring Quarter. Four lectures and recitations each week. General prerequisites must include Physics 617 or permission of the instructor must be obtained. Mr. Hesthal.

A discussion of recent progress in spectroscopy covering the following topics; series lines in spectra, Ritz principle of combination, Bohr's explanation, neutral and ionized states, ionization potential, types of series, electron orbits, generalization of Bohr's assumption, total and partial quantum numbers, Stark effect, intensity of lines; recent infra-red work; new work in ultra-violet; rest-strahlen, and focal isolation; Zeeman effect; absorption spectra, "raies ultimes".

*619. **The Structure of Molecules.** Four credit hours. Spring Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Mr. Nielsen.

Infra-red spectra and molecular structure; molecular potential energy curves and vibration levels; normal modes of vibrations of polyatomic molecules; rotation of molecules; selection rules and degeneracies of molecular energy levels; specific heats; electronic configurations in molecules; the nature of the chemical bond; electric moments; dielectric constants; quantum mechanical analysis of molecular phenomena.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

620. X-rays and Atomic Structure. Four credit hours. Autumn Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Pool.

Production, measurement and effects of X-rays, including gamma rays; classical electron theory of the reflection, refraction, absorption and scattering of X-rays; quantum theory of the origin of X-ray spectra and structure of heavy atoms.

621. Acoustics. Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Knauss.

A discussion of wave motion, forced vibrations, origin, propagation, velocity, interference, diffraction, resonance and energy relations of sound waves, vibration of strings and organ pipes, speech sounds, acoustics of buildings, etc.

622. Thermionics and High Vacuum Phenomena. Four credit hours. Spring Quarter. Four lectures and recitations each week. General prerequisites must include calculus and three Quarters of college physics. Mr. Heil.

An introductory course in the physical theories of thermionic emission; the discharge of electricity from incandescent solids in gases and high vacua; the effect of space charge and electrode potentials on currents in vacuum tubes; the methods of production and measurement of high vacua; the application of thermionic devices to rectification of alternating currents and to the production and detection of oscillations; use of thermionic devices for measurement of very low pressures; the application of multiple electrode tubes to the study of radiation potentials and ionization potentials.

623-624-625. Introduction to Theoretical Physics. Three credit hours each Quarter. Autumn, Winter, Spring. Three lectures and recitations each week. General prerequisites must include Mathematics 601 and 611 and three Quarters of college physics or their equivalents. Mr. Thomas.

This course is an introductory mathematical survey of the field of theoretical physics with emphasis on the application of mathematical methods to the solution of physical problems. The content of the course is selected from the following topics: dynamics of a particle, dynamics of rigid and deformable bodies, hydrodynamics of perfect and elastic fluids, dynamical theory of gases, electrostatics and electromagnetics, transient and alternating currents, electromagnetic waves along wires and in free space.

626. Methods of Theoretical Physics. Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Mr. Alpheus Smith.

An introductory course coordinating the methods of solving problems in dynamics, electrostatics, magnetostatics, hydrodynamics, electrodynamics, heat flow, diffusion, wave motion, etc. The equations governing these phenomena are developed and the effect of boundary conditions on the solutions are studied.

630. Minor Problems in Physics. Three to fifteen credit hours. Any Quarter. Conference, library, and laboratory work. General prerequisites must include satisfactory advanced courses in general experimental and theoretical physics. All instructors.

This course is designed to permit any properly qualified student to avail himself of the library and laboratory facilities of the department for adding to his knowledge and techniques in some subject in physics, for repeating classical physical experiments, or for carrying out minor investigations. Among the topics on which experimental work can be arranged are the following:

(a) Acoustics
(b) Chromatic photometry
(c) Electrical and magnetic measurements at different frequencies
(d) High vacuum phenomena and techniques
(e) Photoelectricity and thermionics
(f) Pyrometry
(g) Radioactivity and atomic disintegration
(h) Visible, ultra-violet, and infra-red spectroscopy
(i) X-rays and crystal structure

Students who have specialized interest in some field of physics may elect this course to secure an opportunity for *independent reading and study* under the supervision of an instructor. The student will be permitted to choose the instructor and, subject to his approval, the field in which this reading is to be done.

†**640. Modern Physics.** Three credit hours. This course cannot be counted toward a major in physics. General prerequisites must include one year of college physics.

This course is intended primarily for teachers of physics, chemistry, and general science in

† Not given during the academic year, 1940-1941.

the secondary schools. It presents in a simple, non-mathematical manner recent advances in physics, with numerous illustrations and applications. The subject matter is organized in a way to make it available for teachers in secondary schools.

†645. Acoustics for Students of Music. Three credit hours. This course cannot be counted toward a major in physics.

An elementary, non-mathematical treatment of acoustics with applications to music, including the following: production, amplification, propagation, and detection of sound waves; characteristics of tones; overtones; resonance; reverberation, localized echoes, phase effects, hearing; musical instruments; acoustical apparatus, etc.

654. X-rays and Crystal Structure. Four credit hours. Winter Quarter. Four lectures and recitations each week. General prerequisites must include calculus and one year of college physics. Given in alternate years. Mr. Blake, Mr. McCaughey, Mr. Harris.

This course is designed for those students of physics, chemistry, and mineralogy who intend to do research work in crystal structures and X-ray analysis.

This course is the same as Mineralogy 654 and Chemistry 654.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 684.

For requirements for degree of Master of Arts with Physics and Education as fields of specialization, see page 33.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

A reading knowledge of German and French is highly desirable.

801. Electramagnetic Theory of Light. Three credit hours. Autumn Quarter. General prerequisites must include Physics 617 and 625 or their equivalents. Mr. Landé.

Resolving power of optical instruments. Maxwell's theory of light. Polarization, refraction, and absorption. Propagation of light in crystals. Electronic theory of dispersion. Electro- and magneto-optics.

*803-*804. Thermodynamics. Three credit hours. Autumn and Winter Quarters. General prerequisites must include Physics 609 and Mathematics 601 and 611 or their equivalents. Mr. Landé.

This course deals with the fundamental principles of thermo-dynamics and their application to such topics as osmotic pressure, electrolytic conduction, diluted and concentrated solutions, the phase rule, chemical equilibrium, metastability of matter, Nernst's heat theorem and the modern theories of specific heats.

805-806. Electromagnetic Field Theory. Three credit hours. Winter and Spring Quarters. General prerequisites must include Physics 609 and Mathematics 601 and 611 or their equivalents. Mr. Landé.

Electro- and magneto-statics. Maxwell's theory of electrodynamics. Propagation of electromagnetic waves. Vibrations. Electro-magnetic phenomena in bodies at rest and in motion. Principle of relativity.

809. General Theory of Small Oscillations. Three credit hours. Autumn Quarter. General prerequisites must include Physics 625 or its equivalent. Mr. Blake.

The general theory of small oscillations will be developed both for free and forced oscillations, with and without damping. The properties of the coefficients of inertia, resistance and elastance will be studied and illustrated. The properties of normal functions will be studied.

810. Applications of the Theory of Oscillations. Three credit hours. Winter Quarter. General prerequisites must include Physics 809. Mr. Blake.

The theory of a loaded string and the conditions under which it simulates a uniform string. Applications to modern telephone engineering. The vibrations of square and circular membranes. The theory of thermionic oscillators. Electrical and acoustical filters. Transmission networks.

† Not given during the academic year, 1940-1941.

* Not given in 1940-1941.

*813. **Line Spectra and Atomic Structure.** Three credit hours. Spring Quarter. General prerequisites must include Physics 618 and 818 or their equivalents. Mr. Green.

Interpretation of spectra series, stationary states and term values, spinning electrons and fine line structure, vector models of atoms, Zeeman effect and Stark effect, intensity and polarization of spectral lines, Pauli's exclusion principle, hyperfine structure and nuclear moment.

*815. **X-rays and Quantum Theory of Atomic Structure.** Three credit hours. Spring Quarter. General prerequisites must include Physics 620 or its equivalent. Mr. Blake.

The Thomas-Fermi distribution of electrons in atoms and the Hartee distribution in relation to atomic scattering; the theory of coherent and incoherent scattering; the dimensions of atoms and molecules as determined by X-ray and electronic scattering; the fine line structure of emission lines and of absorption limits. The use of X-rays in the study of molecular structure.

817-818. **Quantum Mechanics.** Three credit hours. Autumn and Winter Quarters. General prerequisites must include Physics 618 and Mathematics 601 and 611 or their equivalents. Mr. Landé.

Contrast between waves and particles. Uncertainty principle. Schrödinger's wave equation. Perturbation theory. Spectral lines of atoms and molecules. Compton and Raman effects. Molecular forces. Quantum statistics.

819. **Advanced Quantum Mechanics.** Three credit hours. Spring Quarter, General prerequisites must include Physics 818. Mr. Landé.

A topic such as the quantum theory of radiation, of solid bodies, or of atomic nuclei, will be discussed in detail. The topic for 1940-1941 will be announced as soon as possible.

824. **Statistical Mechanics.** Three credit hours. Autumn Quarter. General prerequisites must include Physics 609, 625, and 818, or their equivalents. Mr. Thomas.

Statistical mechanics and its relation to thermodynamics and to quantum theory; classical, Fermi-Dirac, and Einstein-Bose statistics; statistical equilibrium and steady change. Applications to the specific heats of gases and crystals, vapor pressure, chemical equilibrium, imperfect gases, dissociation and ionization, thermionics, temperature radiation, fluctuation and Brownian movement, viscosity and conduction of heat and electricity.

825. **Applications of Statistical and Quantum Mechanics.** Three credit hours. Winter Quarter. General prerequisites must include Physics 824 or permission of the instructor. Mr. Thomas.

The applications of quantum mechanics to special problems such as the theory of symmetrical molecules, or of magnetism; or the application of atomic theory in a special field such as astrophysics, or the conduction of electricity in metals; will be considered in detail.

The topic for 1940-1941 will be announced as soon as possible.

*851. **Band Spectra and Related Topics.** Three credit hours. Winter Quarter. General prerequisites must include Physics 618 and 817 or their equivalents. Mr. Knauss.

Electronic, vibrational, and rotational energy levels of diatomic molecules deduced from band spectra and from quantum theory. Selection rules and intensities in diatomic molecules. Perturbations, dissociation, and predissociation. Isotope effect and Zeeman effect in band spectra. Scattering, dispersion, Kerr effect, dielectric constants, magnetic susceptibilities, and specific heats of molecular gases. Application of band spectra to chemical problems.

852. **Infra-red Molecular Spectra.** Three credit hours. Spring Quarter. General prerequisites must include Physics 618 and 818 or their equivalents. Mr. Nielsen.

An interpretation of various types of infra-red bands in terms of vibrating and rotating molecular models; a detailed treatment of symmetric and asymmetric rotators on the basis of both classical and quantum mechanics, intensities of vibration bands and rotation lines; applications of data on infra-red molecular spectra to related chemical and physical phenomena.

*860-*861-*862. **Mathematical Physics.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Physics 625 or its equivalent. Mr. Thomas.

Advanced mathematical methods and their application to various branches of theoretical physics. The three Quarters will in general be independent and may be taken separately.

* Not given in 1940-1941.

950. Research in Physics. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in physics and mathematics. The student may spend a part or all of his time on his chosen field of research. This course is intended primarily to meet the needs of students who must complete either a thesis or a dissertation as part of the requirements for a degree. Mr. Alpheus W. Smith, Mr. Blake, Mr. Landé, Mr. Alva W. Smith, Mr. Thomas, Mr. Heil, Mr. Green, Mr. Zumstein, Mr. Pool, Mr. Knauss, Mr. Hesthal, Mr. Nielsen, Mr. More, Mr. Shortley, Mr. Gaerttner.

ASTRONOMY

Office, Emerson McMillin Observatory

PROFESSOR MANSON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

605. Introduction to Celestial Mechanics. Four credit hours. Winter Quarter. Four lecture and recitation periods each week. General prerequisites must include three Quarters of calculus and ten Quarter hours of astronomy or ten Quarter hours of college physics. Mr. Manson.

A discussion of rectilinear motion under the law of inverse squares and the law of direct distance; potential and attraction; the problem of two bodies; the general integrals of the problem of 'n' bodies; the restricted problem of three bodies; introductory discussion of lunar theory.

606. Orbits. Four credit hours. Spring Quarter. Four lecture and recitation periods each week. General prerequisites must include Astronomy 605 or its equivalent. Mr. Manson.

A discussion of the computation of positions of planets or comets in elliptical and parabolic orbits. The computation of orbits of planets and comets. Perturbations. Orbits of binary stars.

611. Minor Problems in Astronomy. Three to nine credit hours. Autumn, Winter, and Spring Quarters. Conference, library and laboratory work. General prerequisites must include a course in stellar astronomy. A student may repeat this course until he has earned a total of nine credit hours but not more than three credit hours may be taken in one Quarter. Mr. Manson.

This course is designed to permit properly qualified students to avail themselves of the facilities of the Observatory to work independently on a special problem in practical astronomy, to develop the necessary techniques for the successful use of astronomical instruments and to get some acquaintance with the methods of astronomical research. Each problem must be selected after consultation with the instructor in charge of the course.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Astronomy and Astrophysics at the Perkins Observatory. Autumn, Winter, and Spring Quarters. General prerequisites include acceptable courses in astronomy, mathematics, and physics. Subject of research must be chosen after consultation with the Director. The course may be repeated as often as necessary in pursuit of any special research. (See page 12 for research facilities offered by the Perkins Observatory.)

PHYSIOLOGICAL CHEMISTRY, PHARMACOLOGY, AND MATERIA MEDICA

Office, 108 Hamilton Hall

PROFESSOR SMITH, ASSOCIATE PROFESSOR BROWN, ASSISTANT PROFESSOR WIKOFF, MR. KUYPER, MR. ROSENFELD

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include fundamental courses in general chemistry, qualitative and quantitative analysis and organic chemistry.

Courses 601, 602, 609, 610, and 671 are open only to students doubly registered in the College of Medicine and the Graduate School. Courses 632 and 633 are open only to students doubly registered in the College of Dentistry and the Graduate School. (See page 28.)

PHYSIOLOGICAL CHEMISTRY

601. Physiological Chemistry. Four credit hours. Autumn Quarter. Two lecture and two quiz hours each week. Physiological Chemistry 609 must be taken concurrently. Mr. Brown, Mr. Kuyper.

The chemistry of carbohydrates, lipids, and proteins.

Not available for graduate credit for students majoring in physiological chemistry.

602. Physiological Chemistry. Four credit hours. Winter Quarter. Two lectures and two quiz hours each week. General prerequisites must include Physiological Chemistry 601. Mr. Brown, Mr. Kuyper.

The chemistry of digestion, metabolism, and excretion.

Not available for graduate credit for students majoring in physiological chemistry.

609-610. Physiological Chemistry Laboratory. Two credit hours. Autumn and Winter Quarters. Six laboratory hours each week. Physiological Chemistry 601 must be included as a prerequisite or must be taken concurrently. Mr. Kuyper.

Laboratory work demonstrating the properties of fats, carbohydrates and proteins during the Autumn Quarter. In the Winter Quarter experiments concerning the chemistry of digestion, metabolism and excretion together with a consideration of the chemistry of the tissues.

611. Physiological Chemistry. Five credit hours. Autumn Quarter. Three lecture-quiz hours and six laboratory hours each week. General prerequisites must include quantitative analysis and Chemistry 647, 648, 649, 650. Miss Wikoff.

The chemistry of carbohydrates, lipids, and proteins.

Not open to students who have credit for Physiological Chemistry 601. Not available for graduate credit for students majoring in physiological chemistry.

612. Physiological Chemistry. Five credit hours. Winter Quarter. Three lecture-quiz hours and six laboratory hours each week. General prerequisites must include Physiological Chemistry 611. Miss Wikoff.

The chemistry of digestion, metabolism, and excretion.

Not open to students who have credit for Physiological Chemistry 602. Not available for graduate credit for students majoring in physiological chemistry.

613. Quantitative Methods of Blood Analysis. Three credit hours. Spring Quarter. One lecture and six laboratory hours each week. General prerequisites must include Physiological Chemistry 602 or 612. Miss Wikoff.

Determination of important constituents of the blood.

614. Biochemical Methods of Analysis. Five credit hours. Autumn Quarter. Two hours of lecture or quiz and nine laboratory hours each week. General prerequisites must include Physiological Chemistry 611. Miss Wikoff.

The quantitative analysis of the proteins, fats, and carbohydrates. Special methods for the analysis of biological materials.

618. Toxicology and Legal Medicine. Two or four credit hours. Winter Quarter. Two lectures and six laboratory hours each week. For four credit hours, general prerequisites must include acceptable courses in quantitative analysis and organic chemistry. Mr. Smith.

A course dealing with that portion of medical knowledge which may be of assistance in serving the needs of law and justice including the effects and detection of poison.

619. Minor Problems in Physiological Chemistry. Two to fifteen credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Physiological Chemistry 614. A student may repeat this course and may spend all or part of his time on it during a Quarter. Mr. Smith, Mr. Brown, Miss Wikoff, Mr. Kuyper.

This course is designed to permit any properly qualified person to avail himself of the facilities of the department for carrying out a minor investigation or for adding to his knowledge and technique in physiological chemistry. A student may exercise complete freedom in his choice of instructor to direct his work in this course.

632. Physiological Chemistry. Six credit hours. Spring Quarter. Four lecture or quiz hours and six laboratory hours each week. Mr. Brown, Mr. Kuyper.

The chemistry of the carbohydrates, lipids, and proteins; together with the chemistry of digestion, absorption, metabolism, and excretion; the tissues; the internal secretions.

633. Physiological Chemistry. Two credit hours. Autumn Quarter. One lecture and one quiz hour each week. General prerequisites must include Physiological Chemistry 632. Mr. Brown.

The elements of human nutrition; the effects of diets on the human body; the relation of diets to dentistry.

PHARMACOLOGY

671. Pharmacology. Four credit hours. Spring Quarter. Three lecture or quiz hours and three laboratory hours each week. General prerequisites must include Physiology 635, 636 and Physiological Chemistry 602 or 612. Mr. Smith, Mr. Rosenfeld.

This course treats of the modification of the normal physiological processes of the body by the presence of the more common drugs used in medicine.

675. Methods of Biologic Drug Assay. Three credit hours. Winter Quarter. One lecture and two three-hour laboratory periods each week. General prerequisites must include fundamental courses in biology and chemistry in addition to permission of the instructor. Mr. Smith, Mr. Rosenfeld.

This course includes consideration of the methods in common use for the biological standardization of drugs.

676. Minor Problems in Materia Medica and Pharmacology. Two to fifteen credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include acceptable courses in chemistry or pharmacology. A student may repeat this course and may spend all or part of his time on it during a Quarter. Mr. Smith, Miss Wikoff.

This course is designed to permit any properly qualified person to avail himself of the facilities of the department for carrying out a minor investigation or for adding to his knowledge and technique in materia medica or pharmacology. A student may exercise complete freedom in his choice of instructor to direct his work in this course.

715. Biochemical Biography. One credit hour. Spring Quarter. General prerequisites must include Physiological Chemistry 612. Required of all candidates for graduate degrees in physiological chemistry. Miss Wikoff.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Qualifying Examination for the Master's Degree: At least one Quarter prior to the Convocation at which he expects to receive the Master's degree the candidate must pass a written examination covering general inorganic chemistry, analytical chemistry, and the fundamentals of organic chemistry. He must also give evidence of his ability to read articles in his field written in the German or French language.

PHYSIOLOGICAL CHEMISTRY

813. Seminar in Physiological Chemistry. Two credit hours. Spring Quarter. General prerequisites must include Physiological Chemistry 612. Mr. Kuyper.

Topic for 1941: The Application of Physical Chemistry to Biological Problems.

821. Advanced Physiological Chemistry. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Physiological Chemistry 602 or 612, or Chemistry 841, 842, 843. Miss Wikoff.

A graduate course covering the carbohydrates, lipids, and proteins for students who wish to emphasize the chemical aspect of their training.

822. Advanced Physiological Chemistry. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Physiological Chemistry 602 or 612 or Chemistry 841, 842, 843. Mr. Brown.

An advanced course covering the chemistry of metabolism, tissues, hormones and vitamines.

825-826. Advanced Physiological Chemistry Laboratory. Three credit hours. Autumn and Winter Quarters. Nine hours of library, conference and laboratory work each week. Physiological Chemistry 821 and 822 must be included in the general prerequisites or taken concurrently. Mr. Kuyper.

Advanced courses in biological preparation including the isolation of enzymes, carbohydrates, lipins, proteins and such hormones as epinephrin and insulin.

Not open to students who have credit for Physiological Chemistry 807.

830. Chemistry of Medicinal Substances. Three credit hours. Autumn Quarter. Three conference hours each week. General prerequisites must include Physiological Chemistry 611, 612, or Chemistry 841 and 842. Mr. Smith.

PHARMACOLOGY

850. Experimental Pharmacodynamics. Five credit hours. Autumn Quarter. Three conference or lecture hours and six laboratory hours each week. General prerequisites must include acceptable courses in physiology and chemistry including Physiological Chemistry 602 or 612. Mr. Smith.

This course deals with the actions of drugs on the normal physiological processes, apart from therapeutics, and with some of the theories which seek to explain these actions.

RESEARCH

950. Research in Physiological Chemistry and Pharmacology. Autumn, Winter, and Spring Quarters. Research in Physiological Chemistry will be conducted under the guidance of Mr. Smith, Mr. Brown, Miss Wikoff, Mr. Kuyper; research in Materia Medica under the guidance of Mr. Smith, Miss Wikoff.

PHYSIOLOGY

Office, 204 Hamilton Hall

PROFESSORS HARTMAN, SEYMOUR, AND EDWIN P. DURRANT (EMERITUS), ASSOCIATE PROFESSOR HITCHCOCK, ASSISTANT PROFESSORS R. R. DURANT, BOZLER, AND RING, MR. TIPTON

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Advanced Physiology. Seven credit hours. Autumn Quarter. Five lectures and six laboratory hours each week. General prerequisites must include two Quarters of chemistry and three Quarters of biology. Permission of the department chairman must be obtained. Department staff.

This course deals with cardiovascular system, body fluids, excretion, respiration, and digestion.

602. Advanced Physiology. Eight credit hours. Winter Quarter. Five lectures, one conference, and six laboratory hours each week. General prerequisites must include Physiology 601 or 615. Department staff.

Metabolism, endocrine system, neuromuscular system, central nervous system, and sense organs.

604. Advanced Physiology. Five credit hours. Autumn Quarter. Three lecture or recitation hours and six laboratory hours each week. Open only to students registered in the College of Dentistry. Mr. Hitchcock and staff.

The course deals with the body fluids, cardiovascular system, respiration, digestion, excretion, and neuromuscular system.

605. Advanced Physiology. Seven credit hours. Winter Quarter. Five lecture or recitation hours and six laboratory hours each week. Open only to students registered in the College of Dentistry. Mr. Hitchcock and staff.

A continuation of Physiology 604 dealing with metabolism, nutrition, endocrines, reproduction, and sense organs.

625. Advanced Mammalian Physiology. Five credit hours. Winter Quarter. Two lectures and three three-hour laboratory periods each week. General prerequisites must include Physiology 626, 627, 628 or equivalent. Department staff.

An advanced course in the physiology of the mammal, based largely on laboratory experiments.

626. Comparative Physiology. Five credit hours. Autumn Quarter. Four lecture hours and three laboratory hours each week. General prerequisites must include two Quarters of Chemistry and three Quarters of biological sciences. Mr. Bozler and staff.

General properties of cells, including contractility and irritability and body fluids in different animal types.

627. Comparative Physiology. Five credit hours. Winter Quarter. Four lecture hours and three laboratory hours each week. General prerequisites must include Physiology 626. Mr. Bozler and staff.

Circulation, respiration, digestion, secretion, and excretion in different animal types.

628. Comparative Physiology. Five credit hours. Spring Quarter. Four lecture hours and three laboratory hours each week. General prerequisites must include Physiology 627. Mr. Bozler and staff.

Metabolism, hormones, nervous system and sense organs in different animal types.

629. Endocrinology and Metabolism. Five credit hours. Spring Quarter. Four lectures or recitations and one three-hour laboratory period each week. General prerequisites must include two Quarters of physiology or equivalent biological sciences. Department staff.

A survey of animal metabolism and of the endocrine system with emphasis on their interrelationships.

***630. Advanced Physiology of the Endocrine System.** Five credit hours. Spring Quarter. Four lectures and three laboratory hours each week. General prerequisites must include Physiology 626, 627, and 628, or equivalent. Department staff.

A study of the functions of the thyroid, parathyroid, thymus, pituitary, adrenal, pancreas, gonads, and other organs with possible endocrine function.

635. Advanced Physiology. Seven credit hours. Autumn Quarter. Five lectures and six laboratory hours each week. Open only to students registered in the College of Medicine. Mr. Ring and staff.

Cardiovascular system, body fluids, excretion, respiration, and digestion.

636. Advanced Physiology. Eight credit hours. Winter Quarter. Five lectures, one conference, and six laboratory hours each week. Open only to students registered in the College of Medicine. General prerequisites must include Physiology 635. Mr. Ring and staff.

Metabolism, endocrine system, neuromuscular system, central nervous system and sense organs.

640. Physiology. Five credit hours. Autumn Quarter. Three lectures and four laboratory hours each week. Mr. Tipton and staff.

A course in the neuromuscular and integrative systems with particular reference to exercise.

700. Minor Problems. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Designed for qualified students who wish to begin research. Permission of department chairman required. Department staff.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Prerequisites for graduate students majoring in physiology are the following courses or their equivalents: Courses in elementary chemistry and Chemistry 647, 648, 649, and 650 or equivalent; Courses in elementary zoology. Courses in general physics are desirable.

Requirements for the Master's Degree: (a) The candidate must give evidence of ability to read either scientific French or German. (b) He must pass an oral examination in the general field of physiology at least one Quarter before his final examination. See General Requirements in regard to thesis and final examination (page 30).

Requirments for the Degree of Doctor of Philosophy: See General Requirements (page 36).

815-816-817. Seminar in Physiology. Two credit hours. Autumn, Winter, and Spring Quarters. Required of all students majoring in physiology. Department staff.

950. Research in Physiology. Autumn, Winter, and Spring Quarters. General prerequisites must include Physiology 601 and 602 or equivalent courses and the permission of the department chairman.

The department is equipped to supervise research in circulation, endocrinology, metabolism, and muscle physiology.

POLITICAL ECONOMY

(See Economics and Sociology)

* Not given in 1940-1941.

POLITICAL SCIENCE
Office, 100 University Hall

PROFESSORS SPENCER, WALKER, AND HELMS, ASSOCIATE PROFESSOR AUMANN, ASSISTANT PROFESSORS FOSTER AND BALLIS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

600. Introduction to Political Science. Three credit hours. Winter Quarter. Three meetings each week. Not open to students with credit in political science. Mr. Foster.

An acquaintance with the most significant aspects of American national, state, and local government, including: political parties, elections, legislation, civil service, and courts; the parliamentary and authoritarian governments of Europe; international government. Lectures, readings, and discussions.

Not open to students majoring in political science.

605. Principles of Public Administration I. Five credit hours. Winter Quarter. Five meetings each week. General prerequisites must include ten hours in political science. Mr. Walker.

A consideration of the general problems of public administration; relations between the administration and the other branches of government—executive, legislative, and judicial; the civil service; personnel administration; budgets and accounting; centralized purchasing.

606. Principles of Public Administration II. Five credit hours. Spring Quarter. Five meetings each week. General prerequisites must include fifteen hours in political science. Mr. Walker.

An examination of the principles of public administration as applied to the rendering of service to the public by national, state and local governments. Attention will be paid to such functions as the protection of life and property, the promotion of trade and commerce, the regulation and operation of public utilities, city and metropolitan planning, and the furtherance of public welfare, noting in each case the part which is played by each of the levels of government.

607. Municipal Government. Five credit hours. One Quarter. Winter and Spring. Five meetings each week. Mr. Helms.

A comparative study of modern municipalities in the United States and the principal countries of Europe; their social significance; their governmental structure; their relation to the state; the experience with government by council, mayor, commission, and manager; methods of popular participation.

***610. Problems of County and Rural Government.** Two credit hours. Spring Quarter. Two meetings each week. General prerequisites must include ten hours in political science. Mr. Walker.

A study of structure and function of county government under both rural and urban conditions and an examination of problems of rural government.

611. Introduction to Jurisprudence. Five credit hours. Autumn Quarter. Five meetings each week. Alternating with Political Science 626. Mr. Spencer.

An introductory study of legal concepts. An attempt is made both to give the prospective law student an analytical and historical guide into his subject, and to give those who do not intend to pursue the study of law an idea of its significance in social organization, and its relation to political and economic science.

612. International Law. Three credit hours. Winter Quarter. Three meetings each week. Mr. Spencer.

A study of the principles of international law in their growth and present status, with particular attention to unsettled points, and problems raised by the World War and recent developments.

613. Contemporary International Politics. Five credit hours. One Quarter. Autumn, Winter, Spring. Five meetings each week. Mr. Spencer, Mr. Helms.

Methods and ideals of diplomacy; current problems in international relations, such as the reorganization of Europe, Pan-Americanism, and the Far East; tendencies toward administrative, judicial, and legislative world-organization.

* Not given in 1940-1941.

615. Administration of Justice. Three credit hours. Spring Quarter. Three meetings each week. Mr. Aumann.

A study of the nature, purposes, and limitations of law as administered through courts. The development, organization, and procedure of our judicial system. Recent trends in legal thinking.

616. American Constitutional Law. Five credit hours. Winter Quarter. Five meetings each week. Mr. Aumann.

A study of leading constitutional principles in the United States as interpreted by the courts. Special studies will be made of such topics as the following: the adoption and amendment of constitutions; the judicial power; citizenship; private rights; the powers of Congress; war powers; police power of the states; political privileges. Designed for students who desire a non-technical knowledge of the more important federal and state constitutional principles in the United States.

617. Administrative Law. Three credit hours. Spring Quarter. Three meetings each week. General prerequisites must include Political Science 616. Mr. Walker.

Administrative organization; procedure of administrative bodies; limits of administrative discretion; quasi-judicial and quasi-legislative powers of administrative bodies; relief against administrative action; conclusiveness of administratve findings. Cases and readings.

621. Ancient and Medieval Political Thought. Three credit hours. Autumn Quarter. Three meetings each week. Mr. Spencer.

The chief theories of European government from the time of Plato to the opening of the modern period. Political Science 621, 622, and 623 are intended to present consecutively the development of European political philosophy.

622. Modern Political Thought. Three credit hours. Winter Quarter. Three meetings each week. Mr. Spencer.

The chief theories of European and American government from the sixteenth century to the middle of the nineteenth century. This course is naturally preceded by Political Science 621, though the latter is not required, and is naturally followed by Political Science 623.

623. Contemporary Political Thought. Three credit hours. Spring Quarter. Three meetings each week. Mr. Spencer.

An examination of the more important contemporary trends of political thought and of the theoretical problems of the nature of the state, of government, and of law.

†626. Dictatorship and Absolutism. Three credit hours. Autumn Quarter. Three class meetings each week. Alternating with Political Science 611. General prerequisites must include ten hours in political science. Mr. Spencer.

An examination of certain governmental systems of today which are based on rejection of the ideal of democracy. Special attention given to Russia, Italy, and Germany, but consideration also of minor instances. Political and social causes of this contemporary tendency; administrative and constitutional problems.

***631. Methods of Governmental Research.** Three credit hours. Autumn Quarter. Three meetings each week. Given in alternate years. General prerequisites must include fifteen hours of political science. Mr. Walker.

The materials of political science; history of procedure in political science research; research technique; presentation of results of research.

633. Legislation. Three credit hours. Autumn Quarter. Three meetings each week. Mr. Walker.

The process of law making in the United States, the constituent process, statute law making, legislative drafting, legislative procedure, judicial review, the common law, executive ordinances, popular law making.

634. Public Opinion and Political Processes. Five credit hours. Autumn Quarter. Five meetings each week. Mr. Foster.

A study of the forces which mould the public mind, and of the channels through which public opinion is expressed, viz., the family, the school, the church, the movies, radio, press, pressure groups and propaganda. Lectures and discussion.

635. Elections and Parties. Five credit hours. Winter Quarter. Five meetings each week. Mr. Helms.

A study of voting qualifications, ballot forms, the direct-primary and other forms of nomination, systems of proportional representation, the organization and methods of political parties, and the position and functions of the party system in democracies.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

649. The International Relations of the Far East. Three credit hours. Winter Quarter. Three meetings each week. Mr. Ballis.

The political, economic, and cultural impact of the Occident upon Japan and China; the effects of the World War and Russian Revolution upon the position of the Western Powers in the Orient; the current conflict between Japanese imperialism and the interests of China, the Soviet Union, the United States, and Great Britain.

650. The Governments and Politics of the Far East. Three credit hours. Spring Quarter. Three meetings each week. Mr. Ballis.

The imperial system of China and the experiment with the Republic; Kuomintang rule, the Five-Power constitution, and the conflict between centralization and provincial autonomy. Constitutional imperialism in Japan; the major political parties; militarism and the drift toward Fascism.

701. Minor Problems. Three to five credit hours. Autumn, Winter, and Spring Quarters. Informal conferences, the intent being to allow full scope to the initiative of the student. General prerequisites must include forty hours of credit in the social sciences including fifteen hours in political science. All instructors.

A special topic is assigned to each student and results are tested by the requirement of theses and special examinations.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include a foundation laid in college courses in the historical and social sciences.

805. Political Thought. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Spencer.

Research in the history of political ideas and in the theoretical problems of contemporary politics.

806. Comparative Government. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Spencer.

Research in the governments of foreign countries.

807. Public Opinion and Political Parties. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Helms, Mr. Foster.

A systematic study of the informal phases of politics. Special attention will be given to individual projects dealing with pressure groups, political party organization and procedure, and other aspects of the governmental process.

808. Public Administration. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Walker.

Research in staff and line activities of national, state, and local government.

809. Municipal Government. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Helms.

Reading and research in the municipal governments of the United States and Europe.

810. International Relations. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Spencer.

Research in international relations.

811. Public Law. Three to five credit hours. Autumn, Winter and Spring Quarters. Mr. Aumann.

Readings and research in the field of public law including selected problems in the fields of constitutional law or judicial administration.

814. International Administration. Three to five credit hours. Spring Quarter. Mr. Foster.

A study of the administrative aspects of the process of international cooperation; unions; governing commissions; courts; the sections and technical organizations of the League of Nations; International Labor Organization.

950. Research in Political Science. Autumn, Winter, and Spring Quarters. General prerequisites must include six Quarter-courses in political science.

This course presents an opportunity for advanced research in political science, in such portion of the field as may be agreed upon with the individual student. It is offered in every Quarter, and with any of the members of the department in residence.

POULTRY HUSBANDRY

Poultry Administration Building

PROFESSOR DAKAN, ASSOCIATE PROFESSOR WINTER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

603. Marketing and Processing Poultry Products. Three credit hours. Autumn Quarter. Three recitations each week. General prerequisites must include ten hours of economics and ten hours of chemistry. Mr. Dakan.

Processing frozen, dried, and shell eggs. Marketing live and dressed poultry, eggs, and egg products.

609. Principles and Practices of Incubation and Brooding. Three credit hours. Spring Quarter. Two lectures and one two-hour laboratory period each week. General prerequisites must include ten hours of biological science and ten hours of chemistry. Mr. Winter.

The environmental factors affecting incubation, embryo development, operation of incubators, and systems of brooding.

701. Special Problems in Poultry Husbandry. Three to fifteen credit hours, taken in units of three to five hours each Quarter for one or more Quarters. Autumn, Winter, Spring. Mr. Dakan, Mr. Winter.

Limited to advanced students and must be arranged with the instructor in charge. Each student will be required to make an exhaustive study of some particular phase of poultry husbandry and write a thesis of his study and research. The work must comprise in part some original investigation by the student.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Poultry Husbandry. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work. Mr. Dakan, Mr. Winter.

Research may be done in genetics, embryology, metabolism, and nutritional diseases.

PRACTICAL ARTS AND VOCATIONAL EDUCATION

(See Education)

PRINCIPLES AND PRACTICE OF EDUCATION

(See Education)

PROSTHESIS
Office, Hamilton Hall

ASSOCIATE PROFESSOR STARR, ASSISTANT PROFESSORS WILTBERGER, SHUMWAY, AND BOUCHER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40. These prerequisites include adequate preparation in technical courses concerned.

704-705-706. Minor Problems in Prosthesis. One to three credit hours. Autumn, Winter, and Spring Quarters.

Students will have assigned to them special problems in prosthesis.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40. These prerequisites include adequate preparation in technical and practical courses in prosthesis.

950. Research in Prosthesis. Autumn, Winter, and Spring Quarters.

Research relating to and found in the various endeavors concerning the restoration of the mouth to normal condition through substitutions for lost parts.

PSYCHOLOGY
Office, 325 Arps Hall

PROFESSORS BURTT, GODDARD (EMERITUS), MAXFIELD, PRESSEY, TOOPS, DOCKERAY, RENSHAW, ENGLISH, WILLIAMS, BERRY, AND CARL R. ROGERS, ASSOCIATE PROFESSORS VALENTINE AND A. SOPHIE ROGERS, ASSISTANT PROFESSORS DUREA, EDGERTON, STOGDILL, AND ROBINSON, DEAN GAW

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The department offers instructional and training facilities in practically all divisions of psychology. For administrative purposes and for the general guidance of the student, these have been grouped into a number of areas but there is great flexibility in the working out of a unified program of study. For this last the student is urged at once upon entering on graduate study (or even before when this is possible) to consult with a member of the staff. Not later than the second Quarter of graduate study the student should request the appointment of a major adviser and an advisory committee.

The general comprehensive examination required by the Graduate School of candidates for the doctorate covers all the areas of the department in a general way but permits of some specialization in the fields of the student's chief interest.

The areas of the department are as follows:

1. General theoretical, experimental, and comparative Psychology.
2. Educational Psychology (including mental and educational tests; this area also administers a service course of remedial work with students on probation).
3. Clinical and Abnormal Psychology.
4. Statistics of Psychology and College Personnel. (This area also administers the University Intelligence Tests).
5. Industrial and Business Psychology.
6. Personnel and Counseling.

601. Experimental Psychology. Three to five credit hours. Autumn Quarter. One lecture and two or more laboratory periods each week. Mr. Renshaw.

The laboratory training course in experimental psychology for advanced undergraduates and graduate students. The experiments are selected both for general cultural value and for preparation for technical research in experimental psychology.

Psychology 601, 602, 603 comprise a unit year's work. Students may enter any Quarter.

602. Experimental Psychology. Three to five credit hours. Winter Quarter. One lecture and two or more laboratory periods each week. Mr. Renshaw.

603. Experimental Psychology. Three to five credit hours. Spring Quarter. One lecture and two or more laboratory periods each week. Mr. Renshaw.

605. Physiological Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Dockeray.

The aim of this course is to give a consistent picture of the physical basis of mind. It uses the important facts of the anatomy and physiology of the central and autonomic nervous systems and the more generally accepted theories of nerve functions and their correlations with mental processes.

606. Advanced Physiological Psychology. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include Psychology 605 or permission of the instructor must be obtained. Mr. Dockeray.

This course will deal with the larger problems of the dependence of mental phenomena upon physiological processes such as: the emotions and the sympathetic system; temperament and the endocrines; consciousness and the circulation; effect of unusual physiological conditions (e.g., produced by fatigue, drugs or other toxins) upon various mental processes.

607. Genetic Psychology. Five credit hours. Spring Quarter. Five lecture hours each week. Lectures, recitations, and reports. Mr. Williams.

This course is designed to present the facts of mental development and their significance. Topics considered are: individual development, particularly with reference to the development of the nervous system; inheritance of mental traits; innate tendencies, their characteristics, description, and modification; play; mental states, their physiological basis and development with growth and training; moral and religious development; physical development.

608. Educational Statistics: Elementary. Four credit hours. Autumn Quarter. Two lectures and two two-hour laboratory periods each week. Mr. Toops, Mr. Edgerton.

A basic statistical course for students intending to conduct major or minor research. Frequency distributions, measures of central tendency and variability; construction of graphs and charts; interpretation of results in terms of probability; simple treatment of correlation. Extended practice in the use of calculating machines and computational devices.

609. Exceptional Children: General Survey. Three credit hours. One Quarter. Autumn and Spring. Three lecture hours each week. Lectures, reports, clinics, and visits to public institutions. General prerequisites must include ten hours of psychology. Mr. Maxfield, Mr. Berry.

The social and pedagogical significance of individual differences among children with respect to mental, physical, and social traits and their interrelations. Superior and subnormal children, those with special abilities and disabilities, the blind, the deaf and hard of hearing, the defective in speech, and those who present personality and behavior problems.

610. Adolescence. Three credit hours. One Quarter. Autumn and Winter. Three lectures each week. Mr. English, Mr. Pressey.

A study of the outstanding characteristics of the adolescent boy and girl, the educational and social problems arising at this period, and means for dealing with these problems.

611. Mentally Deficient Children. Three credit hours. Winter Quarter. Three lecture hours each week. Lectures, reports, clinics, and visits to public institutions. General prerequisites must include thirteen hours of psychology. If this does not include Psychology 609, permission of the instructor must be obtained. Mr. Maxfield.

The varieties and grades of mental deficiency, including the backward child of the schools and the distinctly feeble-minded. Consideration of mental deficiency and defect for purposes of educational treatment and social adjustment. The psychology of feeble-mindedness; types, degrees, causes, and consequences.

613. Mental and Educational Tests. Three credit hours. Winter Quarter. Two lectures and one conference and laboratory hour each week. Lectures, readings, classroom demonstrations, and special reports. Mr. Pressey.

A broad basic course for teachers and students of psychology, clinical work, and sociology. The course will begin with a discussion of tests in school subjects, will then take up tests of general and special ability and "non-intellectual" traits, and will conclude with a general discussion of the construction of tests and their use in dealing with various practical and research problems.

***615. Psycho-Educational Diagnosis and Treatment.** Three credit hours. Winter Quarter. One lecture and four laboratory hours each week. General prerequisites must include Psychology 613 or permission of the instructor must be obtained. Mr. Robinson.

Practice in the giving and scoring of tests. Clinical use of test materials in the diagnosis of special disabilities and difficulties in school work; clinical practice with remedial procedures.

616. Individual Testing by the Binet-Simon Method. Two credit hours. One Quarter. Autumn and Winter. Two laboratory periods each week. Reports, laboratory demonstrations, and individual testing. General prerequisites must include fifteen hours of psychology or ten hours of psychology and five hours of professional educational subjects or sociology. Mr. Maxfield, Mr. Durea.

Practice in the technique of the 1937 Stanford revision of the Binet-Simon scale for measuring intelligence. Brief historical and descriptive treatment of the Binet scale, followed by intensive training in its practical use.

617. Advanced Clinical Techniques. Two credit hours. One Quarter. Winter and Spring. Two laboratory periods each week. Laboratory work in clinical techniques. General prerequisites must include Psychology 616 and 618 or one of these and the other taken concurrently. Mr. Maxfield, Mr. Durea.

Advanced study and application of the Binet-Simon method with a review of various revisions (Kuhlmann, Herring, and Hayes). A review of new clinical tests recently published. Test methods used with infants. Preliminary training in the preparation of clinical histories.

618. Clinical Tests. Two credit hours. One Quarter. Autumn and Spring. Two laboratory periods each week. Laboratory demonstrations and individual testing. General prerequisites must include fifteen hours of psychology. Mr. Maxfield, Mr. Durea.

Descriptive and practical laboratory study of standard diagnostic tests and techniques, particularly those known as performance tests.

619. Psychological Clinic. Two or four credit hours. One Quarter. Autumn, Winter, Spring. One four-hour laboratory period each week. Clinic practicum. Individual case studies, reports, case conferences, home visits, and clinical procedure. May be taken for one or two Quarters with a maximum credit of four hours. General prerequisites must include Psychology 616 and 618; Psychology 617 must be included in the prerequisites or taken concurrently or permission of the instructor must be obtained. Mr. Maxfield, Mr. Durea, Mr. Rogers.

Theory and practice of clinical case study, including family history, personal history, school history, and social history. Interpretation of reports of medical examiners, teachers, social agencies, etc., as well as interpretation of test results. Participation in the regular work of the Psychological Clinic conducted by the Department of Psychology. Training in the preparation of clinical reports.

NOTE: A student may profitably receive the special training which this course gives for a Quarter. Repetition does not involve repetition of content but additional practice in clinical procedure.

620. Advanced Psychological Clinic. Two credit hours. One Quarter. Autumn, Winter, Spring. Assignments equivalent to two laboratory periods each week. General prerequisites must include Psychology 619 or permission of the instructor must be obtained. (Students are advised to consult instructor before registering.) May be taken for one or two Quarters with a maximum credit of four hours. Mr. Maxfield, Mr. Durea, Mr. Rogers.

Students will engage in actual clinical service, under the supervision of the instructor. Cases will be studied in the Psychological Clinic and in the nearby public schools and institutions. Special training in the diagnosis of borderline, psychopathic and doubtful cases. Case studies involving psycho-educational or behavior problems. Follow-up work on cases previously studied in the clinic. Problems of educational and vocational guidance. Advanced training in the preparation of clinical reports. Students expecting to deal with problems of college personnel will be assigned to work in this field.

NOTE: A student may profitably receive the special training which this course gives for a second Quarter. Repetition does not involve repetition of content but additional practice in clinical procedure.

* Not given in 1940-1941.

621. Social Psychology. Three credit hours. Autumn Quarter. Three lecture hours each week. Mr. Williams.

The nature and variety of innate tendencies; the relation of these tendencies to acquired behavior and social control; the development of personality.

622. Delinquent Children. Three credit hours. Spring Quarter. Three lecture hours each week. Lectures, reports, and visits to the Bureau of Juvenile Research. General prerequisites must include thirteen hours of psychology. If this does not include Psychology 609, permission of the instructor must be obtained. Mr. Maxfield.

The meaning and significance of delinquency; its psychological basis; causes and prevention; the home and school as factors determining delinquent behavior; the significance of psychological findings for juvenile court procedure; present-day methods of dealing with the problem. The psychology of social conformity versus non-conformity; i.e. misconduct, whether technically delinquent or not.

624. Psychology of Vision and Hearing. Five credit hours. Spring Quarter. Five lectures each week. Mr. Williams.

Production, measurement and control of photic stimuli and measurements of the variations in their effectiveness as determined by physical and physiological factors. The work will consist in part of lecture-demonstrations and experiments and in part of a critical study of the reports of original authors. Special attention will be given to the facts and hypotheses of color-vision and to visual problems in industry.

626. Learning and Thinking. Five credit hours. Winter Quarter. Five lecture and discussion hours each week. Mr. Renshaw.

The development of the principles which underlie the acquired modifications of human behavior.

628. Principles and Economy of Learning. Three credit hours. Winter Quarter. Three lectures each week. Lectures, readings in monographs and journals, discussions. General prerequisites must include permission of the instructor and sixteen hours of psychology or graduate standing. Mr. English.

The control of learning activities; memory and forgetting; transfer of training; generalization and thinking in relation to memory; the more elaborate types of learning such as are seen in school work. Special attention will be paid to recent experimentation and theories.

629. Advanced Psychology. Five credit hours. Autumn Quarter. Five lectures each week. Miss Rogers.

The purpose of this course is to give a larger background to the advanced student of psychology, with respect to other disciplines, especially the sciences, leading to a systematic development of the more complex experiences.

630. Psychology of Feeling and Emotion. Five credit hours. Spring Quarter. Five lectures each week. Miss Rogers.

A study of the various theories of feeling and emotion and the fundamental relations of emotion to instinct. Emotions in relation to various physiological activities. Methods of investigating emotion.

***631. Psychological Theories of Ability.** Three credit hours. Spring Quarter. Three lecture hours each week. This course alternates with Psychology 665. Mr. English.

Critical consideration of naïve ideas about ability; faculty psychology. Influence of Darwinism on conceptions of intelligence. Early mental testing. Binet and his successors. Test results and theories of intelligence. Problems of special abilities and of mental types. Relation of measurement of ability to systematic psychology.

634. Criminal and Legal Psychology. Five credit hours. Winter Quarter. Five lectures each week. Mr. Burtt.

Psychological factors in the determination of reliability of testimony; the technique of detecting crime and falsehood; responsibility; the relation of crime to mental disease or defect; the prevention of crime through environmental factors and heredity.

635. Psychology of Advertising. Three credit hours. One Quarter. Autumn and Spring. Three lectures each week. Mr. Burtt.

The psychological principles involved in effective advertising, notably attention, memory and action, with the contributory factors of association, feeling, instinct, suggestion, and reasoning.

* Not given in 1940-1941.

637. Industrial Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Burtt.

The application of psychology to problems of industrial learning, adjustment of technical to mental factors, monotony, fatigue, environmental conditions, industrial unrest, morale, and accidents.

638. Industrial and Vocational Psychology Laboratory. Three credit hours. Spring Quarter. Two three-hour laboratory periods each week. In addition to the general prerequisites the permission of the instructor must be obtained. Mr. Burtt.

Laboratory work in the application of psychology to industrial and vocational problems, with especial emphasis on the development of psychological techniques for hiring employees. Practice in the devising and standardizing of occupational tests; obtaining and evaluating production ratings; correlation of ratings and tests; interpretation of results from the standpoint of vocational selection or guidance.

639. Psychology and Personnel. Three credit hours. Winter Quarter. Three lectures each week. Mr. Burtt.

The application of psychology to problems of personnel. Selection and placement of employees by tests of intelligence and special ability. Trade tests, job analysis, and rating scales.

640. Educational and Vocational Guidance. Three credit hours. Winter Quarter. Mr. Edgerton, Mr. Toops.

A course dealing with the technique of evaluating psychological and related factors as a basis for making educational and vocational recommendations to individuals. The place of vocational and educational tests, previous record, and personality traits in determination of choice of occupation or course of study.

641. Abnormal Psychology. Five credit hours. Winter Quarter. Five lectures each week. Lectures and reports. Mr. Durea.

An orientation in the problem of abnormal behavior from a clinical and experimental point of view. Discussion of syndromes exhibited in various types of abnormality of both major and minor degrees. Functional disorders stressed. Implications of abnormal behavior for normal conduct. Clinics and demonstrations at the Columbus State Hospital.

642. Psychopathology. Three credit hours. Spring Quarter. Three lectures each week. Lectures and reports.

This course will deal with the unusual (so-called pathological) manifestations of mind. Beginning with a consideration of subconscious phenomena—sleep, dreams, hypnosis, automatic writing, etc., there will be discussed: phobias, suggestion, the psychological aspects of hysteria, and multiple personality, psychasthenia, neurasthenia, and other disorders of personality.

644. Human Motives and Incentives. Three credit hours. Spring Quarter. Three hours each week. Lectures, recitations, and assigned readings. Mr. Valentine.

The psychological bases of initiation and improvement of work. The role of instinct, habit, custom, and tradition, rationalization and psychopathy in motivation. The incentive values of self-ratings, competition, punishment, and such rewards as money, bonuses, participation, and promotion, in relation to the capacities of individuals.

645. History of Psychology. Five credit hours. Autumn Quarter. Five lectures each week. General prerequisites must include sixteen hours in psychology. Mr. Williams.

The course aims to view modern psychological problems in the light of their historical antecedents. The development of various theories such as those of sensation, attention, space perception, and emotion will be traced from earliest times to the present. As far as possible assignments will involve reference to original sources.

646. Contemporary Viewpoints in Psychology. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include fifteen hours in psychology. Mr. Dockeray.

A study of the development of theories of human behavior and a consideration of the simplest assumptions necessary and sufficient to explain the facts of human behavior as dependent on social and biological conditions.

647. Theoretical Psychology. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include sixteen hours in psychology. Mr. Dockeray.

Lectures and assigned readings bearing on the evolution of psychological theory in its relation to the physical and the social sciences.

650. Minor Problems. One or more credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include sixteen hours in psychology and the permission of the instructor must be obtained. All instructors.

Investigation of minor problems in the various fields of psychology.

By permission of the Chairman of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

652. Psychology of High School Subjects. Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include a course in educational psychology. Mr. Pressey.

An analysis of the specific psychological processes involved in algebra, language, science, and other high school subjects, with consideration of the conditions which promote learning in each subject, and examination of textbooks and methods from this point of view.

655. Comparative Psychology. Five credit hours. Autumn Quarter. Five lectures each week. Mr. Valentine.

The principles of animal behavior in relation to human behavior. A study of the similarities and differences in the behavior of animals and of humans and the explanation of these similarities and differences, with special reference to those principles definitely involved in the organism's instinctive and acquired mode of adjusting to its environment.

***656. Comparative Psychology.** Three credit hours. Spring Quarter. Three lectures each week. General prerequisites must include Psychology 655. Mr. Valentine.

A continuation of Psychology 655. Devoted largely to contemporary literature in comparative psychology.

657. Comparative Psychology Laboratory. Three credit hours. Autumn Quarter. One lecture each week and laboratory periods to be arranged. Mr. Valentine.

The methods and results of investigation of animal behavior in relation to human behavior.

659. University Personnel Psychology. Three credit hours. Autumn Quarter. Two lectures and one two-hour laboratory period each week. Given in alternate years. Mr. Toops.

A course designed for students who are preparing for positions in vocational guidance or personnel work in universities and those interested in the achievement of adults. The giving, scoring and interpretation of tests of university entrants. Reading tests and tests of special capacities for adults. Planning a testing program for adults. Theories of adult testing. Comparative study of University personnel programs and procedures. The content of the course will vary somewhat from year to year.

***660. Comparative Psychology Laboratory.** Three credit hours. Spring Quarter. One lecture each week and laboratory periods to be arranged. General prerequisites must include Psychology 657. Mr. Valentine.

A continuation of Psychology 657.

661. Psycho-Educational Problems. Two credit hours. One Quarter. Autumn, Winter, Spring. One four-hour period each week. Clinical studies of pupils presenting psycho-educational problems, under direction of instructor. General prerequisites must include Psychology 619 and permission of instructor must be obtained. May be taken for one or two Quarters with a maximum credit of four hours. Mr. Maxfield, Mr. Durea, Mr. Robinson, Mr. Rogers.

A student will be assigned to a public school where under direction of the principal he will make studies of individual pupils. Practical experience in problems of child guidance and educational adjustment as required by students who expect to become student counselors, visiting teachers, or psycho-clinicians. Some diagnostic and remedial teaching. Preparation of reports to the principal under direction of instructor.

NOTE: A student may profitably receive the special training which this course gives for a second Quarter. Repetition does not involve repetition of content but additional practice in clinical procedure.

662. Pre-School Child. Three credit hours. Spring Quarter. Two lectures and one conference hour each week. Mr. Dockeray, Mr. Valentine.

A special study of the child from birth to six years. The relation of maturation to learning, frustration and social development is examined with emphasis on the practical applications in the

* Not given in 1940-1941.

home and school. The theoretical implications for an understanding of adult behavior are also considered. Opportunity will be afforded for students with special interests to work along these lines individually or in groups.

663. Psychology of the Elementary School Period. Four credit hours. Autumn Quarter. Four class meetings each week. Mr. English, Mr. Pressey.

The psychological development of the child from five to twelve years. Effects of the school and out-of-school activities on development. Analysis of significant psychological problems involved in curricular activities. Provision by school and other social agencies for the psychological needs of the child.

664. Observation of the Elementary School Child. One credit hour. One Quarter. Autumn, Winter, Spring. General prerequisites must include Psychology 663. If taken any other Quarter than the one following that in which Psychology 663 is taken, special permission of the instructor must be obtained in advance. In special cases, by permission it may be carried concurrently with Psychology 663. Mr. English, Mr. Pressey, Mr. Robinson.

Observation of a particular individual child at least one hour weekly over a twenty-week period. Preparation of a detailed report of observations, together with an evaluation of test results, school records, physical and mental examination and case-history records of this individual.

NOTE: The observations should normally begin about the middle of the Quarter during which Psychology 663 is being taken and be continued to the end of the following Quarter. Only in highly special cases can the observations be condensed into less than twenty weeks as the essential objective is a long-continued acquaintance with a developing child.

†665. The Psychology of Character Formation. Three credit hours. Winter Quarter. Three meetings each week. General prerequisites must include ten hours in psychology. This course alternates with Psychology 631. Mr. English.

Psychological analyses of character, in which are brought out the relation of character to its biological bases and its distinction from personality. Major attention is given to recent experimental studies of morale and of attitudes as factors in character, of the measurement of character and of the effect of varying environment influences on character.

667. Psychology of Music. Three credit hours. Winter Quarter. General prerequisites must include a course in educational psychology and a course in advanced harmony or consent of the instructor must be obtained. Mr. Wilson.

The contribution of rhythm, harmony, tone color, form, familiarity, voice and tactual association to the emotional experience in music. Analysis and measurement of musical talent. Psychological factors in musical interpretation and in the teaching of music.

668. Principles of Gestalt Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Williams.

A survey of the experimental work which supplied the data for the Gestaltist. A study of the basic dynamic principles which constitute the Gestalt system. Application of these principles to perception, learning, thinking, and emotion.

669. Gifted Children. Three credit hours. Autumn Quarter. Lectures, readings, and reports. General prerequisites must include thirteen hours of psychology. If this does not include Psychology 609, permission of the instructor must be obtained. Mr. Berry.

A study of the nature, development, and education of the gifted child with special reference to those psychological traits that distinguished him from the typical child.

†670. Psychological Problems of Adult Life. Three credit hours. Spring Quarter. Mr. Pressey.

A survey of the important recent psychological literature on changes in capacity for learning through the adult years and into old age, changes in incentives and interests throughout these years, emotional development and orientation of adults, psychological problems of work adjustment, adult and parent education, leisure.

Not open to students who have credit for Psychology 825.

674. Research Problems of the Dean of Women. One or more credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Survey 665 or its equivalent, and the approval of the instructor must be obtained. Mrs. Gaw.

Investigation of the minor psychological problems which arise in connection with the social, scholastic, and vocational adjustments of undergraduate women.

† Not given during the academic year, 1940-1941.

676. Methods and Viewpoints in Educational Psychology. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Robinson.

A critical appraisal of the implications for education of modern psychological movements.

***677. Graphic Methods.** Two credit hours. Spring Quarter. Two lectures each week. Given in alternate years. Mr. Toops.

Graphic presentation of the results of experiments and investigations; histograms, bar charts, specialized charts; tri-dimensional presentation.

678. Psychology of Personality. Three credit hours. Spring Quarter. Three lectures each week. Mr. Durea, Mr. Valentine.

This course will consider the individual both as a social and biological unit, relating each group of factors to the development of personality. Ample attention will be given to questions such as integration, measurement of traits, personality types, faulty schemes of character analysis; effect of glands of internal secretion; self-analysis. The course is correlative to Psychology 641.

679. Psychology of Public Attitudes. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Burtt.

The influence of imitation, suggestion, transfer of emotions, postural set, and defense mechanisms on public attitudes. Psychological factors in leadership and morale. Special emphasis on the experimental approach and such techniques as scaling attitudes and factor analysis.

680. Educational Tests and Measurements. Three credit hours. Spring Quarter. Three lectures each week. Assigned readings and reports. Open to seniors and graduate students of experience with permission of the instructor in charge. Mr. Heck, Mr. Pressey.

A service course for those majoring in Elementary and Secondary Education and School Administration. The course will consider selection of tests and organization of testing programs for elementary and secondary schools; the use of tests in classification, diagnosis, prognosis, and educational guidance; the principles of teacher-made tests; and effect of testing on marking systems.

681. Psychology of Diagnostic and Corrective Instruction in Secondary Education. Five credit hours. One Quarter. Autumn, Winter, Spring. One lecture, one conference, and five laboratory hours each week. General prerequisites must include thirteen hours of psychology and permission of the instructor must be obtained. Enrollment is limited by extent of laboratory facilities. Mr. Robinson.

Psychological principles involved in aiding students in high school and college in their adjustment to curricular and extra-curricular activities. This includes methods of psycho-educational diagnosis, principles of effective learning and remedial reading instruction. Laboratory practice is obtained by assisting beginning college students with such problems.

682. Laboratory Practice in Diagnostic and Corrective Instruction. Three credit hours. One Quarter. Autumn, Winter, Spring. One conference and five laboratory hours each week. General prerequisites must include Psychology 681. Mr. Robinson.

A continuation of Psychology 681.

683. Psychology of Reading. Three credit hours. Winter Quarter. Three lecture and discussion hours each week. General prerequisites must include fifteen hours of psychology, or graduate standing and permission of the instructor are required. Mr. Robinson.

Psychological analysis of the reading process. The relationship of this to teaching and remedial methods. Discussion of remedial reading techniques.

685. Educational and Vocational Guidance Laboratory. Three to five credit hours. One Quarter. Autumn, Winter, Spring. One two-hour lecture, discussion and demonstration period and three to six hours of practical experience each week in counseling and related activities. Permission of the instructor must be obtained. This course may be repeated until ten hours have been earned. Mr. Edgerton.

An opportunity for mature students who have adequate background to obtain practical experience in guidance and counseling. Practice in counseling with out-of-school youth between

* Not given in 1940-1941.

18 and 25 years of age, with parents, employers, and social agencies. At present the counseling is done through the facilities of the Columbus Counseling Bureau.

NOTE: It is suggested that students may find considerable profit in repeating the course. Such repetition represents additional experience and meeting a greater variety of problems.

703. Special Topics in Psychology. Three credit hours. One Quarter. Winter and Spring. Lectures and discussions. General prerequisites must include fifteen Quarter hours of Psychology course in the "600" group or above and permission of the instructor. May not be elected more than twice. All instructors.

The topics will vary from Quarter to Quarter and will be announced at least one month in advance. The following are typical of the topics contemplated in the near future: factor analysis, technique of constructing personnel forms, techniques of the remedial interview, contribution of experimental neuroses to abnormal psychology, psychology of senility, punched card machine techniques for psychological statistics.

NOTE: For Course in Principles of Psychology for Advisers, see Survey 665 on page 217.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include the equivalent of at least two years of psychology; or of one year of psychology and one year of college work in one of the following subjects: philosophy, mathematics, physiology, physics, zoology, sociology.

802. Seminar in Experimental Psychology. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Renshaw, Mr. Dockeray, Miss Rogers, Mr. Valentine.

803. Seminar in Educational Psychology. Two credit hours. Winter and Spring Quarters. Mr. Pressey, Mr. English.

*804. Seminar in Tests and Measurements. Two credit hours. Spring Quarter. Mr. Pressey.

805. Contemporary Psychological Literature. One credit hour. Autumn, Winter, and Spring Quarters. Mr. Renshaw.

806. Seminar in Abnormal Psychology. Two credit hours. Winter and Spring Quarters. Mr. Maxfield, Mrs. Stogdill, Mr. Rogers.

807. Seminar in Industrial Psychology. Two credit hours. Winter Quarter.

808. Psycho-Analysis. Two credit hours. Autumn Quarter. Two lectures each week. Mr. Durea.

This course will deal with the history and development of psycho-analysis; the theories of Freud, Jung, and others. Special emphasis will be placed on those concepts that are of value to teachers in their effort to appreciate the individual differences in students. The significance of the unconscious and the various methods of tapping the unconscious.

†810. Psychological Problems in Higher Education. Two credit hours. Autumn Quarter. One meeting each week. Mr. Pressey.

A critical review of the research work thus far done on such problems as study methods, background information essential for college work, individual differences, placement tests, measurement of progress. The course is intended to give graduate students preparing for college or university positions contact with current educational research regarding the problems they will meet, and develop a research attitude toward these problems.

811. Advanced Theoretical Psychology. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include Psychology 647. Mr. Dockeray.

814. Advanced Statistics. Four credit hours. Winter Quarter. Two lectures and two two-hour laboratory periods each week. General prerequisites must include a course in educational statistics. Mr. Toops.

Special cases in correlation; non-linear regression; construction of criteria; sampling;

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

statistical machines; derivation of commonly used equations; critical readings; construction of tables and graphs to meet the research needs of individual students.

*815. **Seminar in Psychological Statistics.** Two credit hours in each of two successive Quarters. Autumn and Winter Quarters. One two-hour discussion period each week. Mr. Toops, Mr. Edgerton.

Statistical background equivalent to the sequence Psychology 608, 814 is assumed. Critical discussion of problems in the forefront of statistical psychology.

816. **Special Statistical Methods.** Four credit hours. Spring Quarter. Two lectures and two two-hour laboratory periods each week. General prerequisites must include Psychology 608 and 814 or equivalent. Mr. Edgerton.

The statistics of aptitudes, mental growth and attainment. Item analysis, quantification of qualitative data and pertinent psycho-physical theorems. Construction of tables and graphs to meet the individual needs of advanced students of psychology and education.

*822. **Seminar in Student Personnel Psychology.** Two credit hours. Autumn Quarter.

826. **Practicum in the Use of Personality Adjustment Techniques.** Three to five credit hours. Autumn, Winter, and Spring Quarters. This course may be repeated until ten credit hours have been earned. Lectures, group discussions, demonstrations, individual conferences, practical experience in interviewing, case recording, and related activities. General prerequisites must include twenty hours of psychology including one of the following courses: Psychology 619-620, 661, 681-682, 685, and permission of the instructor. The enrollment is limited by the extent of laboratory facilities. Mrs. Stogdill.

A opportunity for mature students with adequate background and training to obtain practical xeperience, under guidance, in the use of personality adjustment techniques at the college level.

NOTE: It is suggested that students may find it profitable to repeat the course. Such repetition represents additional experience in meeting a greater variety of problem situations.

831. **Advanced Experimental Laboratory.** Three to fifteen credit hours. Autumn Quarter. Laboratory and conferences. Admission only after consultation with the instructor. Mr. Renshaw.

Quantitative methods in sensory fields, advanced studies in perception, learning, and memory.

832. **Advanced Experimental Laboratory.** Three to fifteen credit hours. Winter Quarter. Mr. Renshaw.

833. **Advanced Experimental Laboratory.** Three to fifteen credit hours. Spring Quarter. Mr. Renshaw.

950. **Research in Psychology.** Autumn, Winter, and Spring Quarters. All instructors.

Primarily intended for students offering theses for advanced degrees.

By permission of the Chairman of the Department and the Director of the Bureau of Educational Research, students enrolled in this course may obtain credit for research work done under the auspices of the Bureau staff.

RHETORIC AND ENGLISH LANGUAGE

(See Speech)

ROMANCE LANGUAGES AND LITERATURES

Office, 111 Derby Hall

PROFESSORS HENDRIX, MOORE, HAVENS, ROCKWOOD, MONROE, ANIBAL, DEMOREST, AND SCHUTZ, ASSISTANT PROFESSORS GUTIERREZ AND AMIEL

GRADUATE ROMANCE CLUB

The Graduate Romance Club fosters an interest in advanced work in the Romance Languages and Literatures. Its meetings, held monthly, consist of reports by graduate students or faculty members on their own investigations as well as on books and articles bearing on the field.

The problems of graduate students and themes suggested by faculty members will be discussed. Regular attendance of graduate students in the department is strongly urged.

* Not given in 1940-1941.

FRENCH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

600. French Literature of the Seventeenth Century, 1680-1715. Three credit hours. Spring Quarter. Three meetings each week. Lectures, collateral reading, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

The close of the seventeenth century. The Quarrel of the Ancients and the Moderns. Selected work of LaFontaine, LaBruyère, Fénelon, Saint Simon, and Saint Evremond will be read.

601. French Literature of the Seventeenth Century, 1600-1660. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Lectures, collateral reading, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

The pre-Classic period; formation of the school of 1660. The Libertines, growth of French comedy and tragedy, The Précieuses, The French Academy will be discussed. Selected works of Malherbe, De Viau, Descartes, Balzac, and Corneille will be read.

602. French Literature of the Seventeenth Century, 1660-1680. Five credit hours. Autumn Quarter. Four meetings each week. a fifth at the option of the instructor. Lectures, collateral reading, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

The school of 1660. Selected works of Pascal, Molière, Boileau, Racine, La Rochefoucauld, Mme. de Sévigné, Bossuet, and Mme. de Lafayette will be read.

***603. French Literature of the First Half of the Nineteenth Century.** Five credit hours. Spring Quarter. Five recitations each week. Lectures, collateral reading and reports. General prerequisites must include two introductory courses in French literature. Mr. Demorest.

French literature from 1800 to 1850. The development of romanticism in the novel, poetry, and the theatre.

***605. French Literature of the Fifteenth and Sixteenth Centuries.** Three credit hours. Autumn Quarter. Three lectures each week. Given biennially. General prerequisites must include two introductory courses in French literature. Mr. Moore.

Villon, Rabelais and contemporaries.

606. French Literature of the Sixteenth Century. Three credit hours. Winter Quarter. Three recitations each week. Given biennially. General prerequisites must include two introductory courses in French literature. Mr. Moore.

Montaigne; the Pléiade.

607. French Literature of the Eighteenth Century, 1700-1750. Three credit hours. Autumn Quarter. Three lectures each week. General prerequisites must include two introductory courses in French literature. Mr. Havens.

Rapid reading, with lectures and reports. Fontenelle, Bayle, Crébillon, Voltaire, Montesquieu, Marivaux, and others.

608. French Literature of the Eighteenth Century, 1750-1789. Three credit hours. Winter Quarter. Three lectures each week. General prerequisites must include two introductory courses in French literature. Mr. Havens.

Rapid reading, with lectures and reports. Voltaire, Rousseau, Diderot, Beaumarchais, and others.

***609. The French Novel in the Nineteenth Century.** Three credit hours. Autumn Quarter. Three lectures each week. Given biennially, alternating with

* Not given in 1939-1940.

French 611-612. General prerequisites must include two introductory courses in French literature. Mr. Demorest.

Romanticism, realism and naturalism in the novel. Chateaubriand, Mme. de Staël, Constant, Stendhal, Balzac, Hugo, George Sand, Flaubert, the Goncourt Brothers, Zola, Daudet, Maupassant, Loti, and others. Lectures, reports, and collateral reading.

*610. The French Novel in the Twentieth Century. Three credit hours. Winter Quarter. Three lectures each week. Given biennially, alternating with French 611-612. General prerequisites must include two introductory courses in French literature. Mr. Demorest.

Bourget, Barrès, France, Huysmans, Estaunié, Rolland, Boylesve, Proust, Gide, Romains and others. Lectures, reports and collateral reading.

611. The Comedy of Manners in the Nineteenth Century, 1800-1880. Three credit hours. Autumn Quarter. Three lectures each week. Given in alternate years. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

La Pièce Bien Faite, La Pièce à Thèse, Picard, Scribe, Dumas fils, Augier, Sardou. Rapid readings with lectures and reports.

612. The Comedy of Manners of the Nineteenth Century, 1880-1914. Three credit hours. Winter Quarter. Three lectures each week. Given biennially, alternating with French 609-610. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

Le Théâtre Libre, Becque, Curel, Hervieu, Lavedan, Donnay, Bernstein, Bataille, Guitry. Rapid reading with lectures and reports.

623. Cours de Style. Three credit hours. One Quarter. Autumn and Spring. Three recitations each week. General prerequisites must include a "600" course in French literature, and permission of the instructor must be obtained. This course is conducted in French. It is limited to twenty students. Mr. Carlut.

624. Cours de Style (Continued). Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include French 623, and permission of the instructor must be obtained. This course is conducted in French. It is limited to twenty students. Mr. Carluet.

†627. French Pronunciation. Three credit hours. Three meetings each week with laboratory practice. General prerequisites must include six Quarters of collegiate French or the equivalent, with a grade not less than "C" and permission of the instructor must be obtained. This class is limited to twelve.

The formation of French sounds. Lectures, with exercises in the use of the symbols of the International Phonetic Association. A systematic study of the rules of French pronunciation. Careful drill in the reading of French. Designed for advanced students who expect to teach French.

Not open to students who have credit for French 632.

628. Modern French Syntax. Five credit hours. One Quarter. Autumn and Spring. General prerequisites must include six Quarters of collegiate French or the equivalent, with a grade of "C," or consent of the instructor. Mr. Schutz.

A careful study of French grammar, with composition to illustrate. Designed for advanced students who expect to teach French.

629. History of the French Language. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include at least one "600" course in French. Mr. Schutz.

A rapid survey of the French language, with special reference to the social and cultural conditions involved; the historical development of sounds, forms, syntax, and vocabulary. The relation between this development and literary movements.

632. French Pronunciation and Diction. Five credit hours. One Quarter. Autumn and Winter. Five meetings each week with laboratory practice. Gen-

* Not given in 1940-1941.
† Not given during the academic year, 1940-1941.

eral prerequisites must include six Quarters of collegiate French or the equivalent, with a grade not less than "C" and permission of the instructor must be obtained. The class is limited to twelve. Mr. Rockwood.

The formation of French sounds. Lectures, with exercises in the use of the symbols of the International Phonetic Association. A systematic study of the rules of French pronunciation and diction. Careful drill in the reading of French. Designed for advanced students who expect to teach French.

Not open to students who have credit for French 627.

635. Cour de Civilisation Française. Three credit hours. Spring Quarter. General prerequisites must include the equivalent of six Quarters of French and permission of the instructor. The class is limited to fifteen. Mr. Demorest.

A study of the major developments of French culture down to the nineteenth century. The course is designed to give the student greater facility in understanding, speaking, and writing French.

640. France in Contemporary Literature. Three credit hours. Spring Quarter. Lectures, collateral readings, and reports. General prerequisites must include two introductory courses in French literature. Mr. Rockwood.

Recent developments in the novel, essay and poetry and their relationships with French life. Proust, Gide, Barbusse, Duhamel, Maurois, Romains, Morand, Malraux, Colette, Claudel, Valery, and others. Regionalism, etc.

650. Modern French Poetry. Three credit hours. Spring Quarter. General prerequisites must include two introductory courses in French literature. Mr. Havens.

French Romanticists, Parnassians, and Symbolists, Lamartine, Vigny, Hugo, Musset, Gautier, Baudelaire, Leconte de Lisle, Heredia, Verlaine, and others.

701. Minor Problems in French. Three to five credit hours. Autumn, Winter, and Spring Quarters. Professors and Associate Professors.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 692.

ITALIAN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Modern Italian Literature, 1800-1850. Five credit hours. Spring Quarter. Five recitations each week. Mr. Moore.

Foscolo, Manzoni, Pellico, Leopardi.

***602. Modern Italian Literature, 1851-1900.** Five credit hours. Winter Quarter. Five recitations each week. Given in alternate years. Mr. Moore.

Rovetta, Carducci, Giacosa, Fogazzaro.

611. Dante's Life and Works. Three credit hours. Winter Quarter. Three lectures each week. Given in alternate years. General prerequisites must include Italian 602 or the permission of the instructor must be obtained. Mr. Moore.

Reading of the *Vita Nuova* and *The Inferno*, Cantos 1-16.

701. Minor Problems in Italian. Three to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Moore.

SPANISH

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

605. Advanced Composition and Conversation. Three credit hours. Autumn Quarter. Three recitations each week. Given in alternate years. General

* Not given in 1940-1941.

prerequisites must include a course in Spanish composition and a "600" course in Spanish literature. Mr. Gutierrez.

This course, conducted wholly in Spanish, is designed especially for prospective teachers and for persons desiring a practical command of the language. The subject matter will be for the most part in history, customs, and manners of Spain.

606. Advanced Composition and Conversation (Continued). Three credit hours. Winter Quarter. Three recitations each week. Given in alternate years. General prerequisites must include Spanish 605. Mr. Gutierrez.

This course, conducted wholly in Spanish, is designed especially for prospective teachers and for persons desiring a practical command of the language. The subject matter will be for the most part in history, customs, and manners of Spain.

*607. The Modern Spanish Novel. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 609-610. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A careful study of the development of the modern Spanish novel, reading of representative authors. Lectures, collateral reading, and reports.

*608. The Modern Spanish Novel (Continued). Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 609-610. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A careful study of the development of the modern Spanish novel, reading of representative authors. Lectures, collateral reading, and reports.

609. Romantic Drama and Poetry in the Nineteenth Century. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 607-608. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A survey of the movements in Spanish drama and poetry during the first half of the nineteenth century. Lectures, collateral reading, and reports.

610. Modern Spanish Drama. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given biennially, alternating with Spanish 607-608. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A survey of the movements in Spanish drama and poetry during the second half of the nineteenth century. Lectures, collateral reading, and reports.

*611. Drama of the Golden Age. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

An intensive study of a limited number of plays of the representative dramatists. Lectures, collateral reading, discussion, and reports.

613. The Picaresque Novel. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

An intensive study of Lazarillo de Tormes, Guzmán de Alfarache, and El Buscón. Lectures, collateral readings, discussion, and reports.

614. Cervantes. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

A study of the works of Cervantes with especial emphasis on the Quixote. Lectures, collateral reading, discussion, and reports.

*615. Survey of Spanish Literature from the Earliest Times to the Seventeenth Century. Five credit hours. Autumn Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General pre-

* Not given in 1940-1941.

requisites must include two introductory courses in Spanish literature. Mr. Anibal.

Lectures, collateral reading, discussion, and reports.

616. Survey of Spanish Literature of the Seventeenth and Eighteenth Centuries. Five credit hours. Winter Quarter. Four meetings each week, a fifth at the option of the instructor. Given in alternate years. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

Lectures, collateral reading, discussion, and reports.

617. Modern Spanish Syntax. Five credit hours. Autumn Quarter. Five recitations each week. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

Study of syntax, designed for advanced students who expect to teach Spanish.

620. Spanish Pronunciation and Diction. Five credit hours. Winter Quarter. Five recitations each week. General prerequisites must include two introductory courses in Spanish literature.

Careful and detailed study of special problems involved in teaching Spanish to English-speaking students. Laboratory analysis of differences between English and Spanish pronunciation.

***626. The Spanish Drama of the Sixteenth Century.** Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include two introductory courses in Spanish literature. Mr. Anibal.

630. Survey of Spanish-American Literature. Five credit hours. Spring Quarter. Four meetings each week, a fifth at the option of the instructor. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

A study of the masterpieces of Spanish-American literature. Lectures, collateral reading, discussion, and reports.

***640. Spain in Twentieth Century Literature.** Three credit hours. Lectures, collateral readings, and reports. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

The Generation of 1898, including essayists and others who contributed to the Revolution of 1936.

***641. Spain in Twentieth Century Literature (Continued).** Three credit hours. Lectures, collateral readings, and reports. General prerequisites must include two introductory courses in Spanish literature. Mr. Hendrix.

The Generation of 1898, including essayists and others who contributed to the Revolution of 1936.

***660. The Comedia of Lope de Vega and his School.** Three credit hours. General prerequisites must include two introductory courses in Spanish literature.

The development of Lope's formula and a study of representative plays; Tirso de Molina; Alarcón. Lectures, collateral reading, discussion, and reports.

701. Minor Problems in Spanish. Three to five credit hours. Autumn, Winter, and Spring Quarters. Mr. Anibal, Mr. Hendrix.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 692.

* Not given in 1940-1941.

ROMANCE LANGUAGES

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Students intending to major in Romance Languages are urged to elect the following courses outside the department: History of France (History 624, 625), Introduction to the Study of the History of Language (Greek 701), the History of Philosophy (Philosophy 601-602-603), Studies in Criticism (English 605), Vulgar Latin (Latin 627). No student will be considered as a candidate for the M.A. degree unless his program includes at least two courses exclusively for graduates.

French 801 and 802 are required of candidates for the Master's degree in French.

Spanish 805 and 806 are required of candidates for the Master's degree in Spanish.

FRENCH

801. Introduction to Old French Linguistics. Three credit hours. Winter Quarter. Three recitations each week. General prerequisites must include at least three years of collegiate French and some knowledge of Latin. French 813 is desirable but not essential. Mr. Schutz.

Elements of Old French phonology and morphology.

802. Introduction to Old French (Continued). Three credit hours. Spring Quarter. Three recitations each week. General prerequisites must include French 801. Mr. Moore.

Continuation of Old French phonology and morphology, semantics. Some attention to text criticism.

***803. Old Provencal.** Three credit hours. Winter Quarter. General prerequisites must include French 802. Mr. Schutz.

Study of the language and literature of the Troubadours; Appel's Provenzalische Chrestomathie (Leipzig, 6th edition).

***804. Old Provencal (Continued).** Three credit hours. Spring Quarter. General prerequisites must include French 803. Mr. Schutz.

Study of the language and literature of the Troubadours; Appel's Provenzalische Chrestomathie (Leipzig, 6th edition).

811. Seminar in French Literature. Three to five credit hours. Autumn Quarter. General prerequisites must include three years of collegiate French and permission of the instructor must be obtained. Mr. Havens.

Topic: Rousseau.

812. Seminar in French Literature (Continued). Three to five credit hours. Winter Quarter. General prerequisites must include three years of collgiate French and permission of the instructor must be obtained. Mr. Demorest.

Topic: Contemporary regionalism.

813. Old French Literature. Three credit hours. Autumn Quarter. General prerequisites must include three years of collegiate French. Mr. Schutz.

Introduction to the reading of Old French. Reading and discussion of the Chanson de Roland, the Yvain of Chrétien de Troyes, representative lyrics and the Tristan of Béroul. Lectures on the main currents of Old French Literature.

817. Seminar in French Literature. Three to five credit hours. Spring Quarter. General prerequisites must include three years of collegiate French and the permission of the instructor must be obtained. Mr. Moore.

Topic: Victor Hugo.

950. Research in French Language or Literature. Autumn, Winter, and Spring Quarters. General prerequisites must include not less than four years of collegiate French and permission of the instructor must be obtained. Mr. Moore, Mr. Havens, Mr. Rockwood, Mr. Schutz, Mr. Demorest.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

* Not given in 1940-1941.

ITALIAN

950. Research in Italian Language or Literature. Autumn, Winter and Spring Quarters. Mr. Moore.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

SPANISH

805. Old Spanish. Three credit hours. Autumn Quarter. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor must be obtained. Mr. Hendrix.

806. Old Spanish (Continued). Three credit hours. Winter Quarter. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor must be obtained. Mr. Hendrix.

815. Seminar in Spanish Literature. Three to five credit hours. Autumn, Winter, and Spring Quarters. Lectures, readings, and reports. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor must be obtained. Mr. Hendrix, Mr. Anibal.

†821. Old Spanish Literature. Three credit hours. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor must be obtained. Mr. Hendrix.

Certain masterpieces of Spanish literature often not included in the usual survey courses.

950. Research in Spanish Language or Literature. Autumn, Winter, and Spring Quarters. General prerequisites must include not less than three years of collegiate Spanish and permission of the instructor must be obtainted. Mr. Hendrix, Mr. Anibal.

This course is designed to meet the needs of individual graduate students who are pursuing a major study in the Department of Romance Languages.

RURAL ECONOMICS
Office, 113 Townshend Hall

PROFESSORS FALCONER, HENNING, McBRIDE, WERTZ, AND MANGUS, ASSISTANT PROFESSORS SITTERLEY AND HAUCK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

NOTE: For Marketing courses given in cooperation with other departments, see the following courses:

Animal Husbandry 608. Live Stock Marketing.
Animal Husbandry 626. The Marketing of Dairy Products.
Horticulture 628. The Marketing of Fruits and Vegetables.
Poultry Husbandry 603. Marketing and Processing Poultry Products.

602. Advanced Farm Organization. Three credit hours. Autumn Quarter. Three lectures each week. Mr. Falconer.

A more detailed and advanced consideration of the economic principles involved in farm organization. The application of these principles to current agricultural production problems.

603. Cooperation in Agriculture. Five credit hours. Winter Quarter. Five lectures each week. Mr. Henning.

A study of agricultural cooperation, mainly as found in the United States. The types of cooperative marketing, manufacturing and purchasing organizations, collective bargaining, cooperative credit and insurance.

605. The Agricultural Industry. Three credit hours. Winter Quarter. Three lectures each week. Mr. Falconer.

The importance of the agricultural industry to the welfare of the nation. Some characteristics of the farming industry. Foreign competition, present and prospective. State and federal regulation, encouragement and aid to agriculture in the United States and foreign countries.

† Not given during the academic year, 1940-1941.

606. Rural Sociology. Five credit hours. Autumn Quarter. General prerequisites must include twenty hours in economics, sociology, or rural economics. Mr. Mangus.

A general course in the sociology of rural life. Emphasizes the fundamental and conditioning factors in rural social development, rural social institutions and the nature of rural social organization.

607. Rural Social Organization. Four credit hours. Winter Quarter. General prerequisites must include twenty hours in economics, sociology, or rural economics. Mr. Mangus.

An intensive course in the theory and technique of rural social organization. The characteristics of rural group life, the processes of group organization, and the conditions and factors affecting the nature, permanence and success of groups organized on a local, state, and national basis are given consideration.

608. Rural Social Environment. Three credit hours. Autumn Quarter. General prerequisites must include twenty hours in sociology or its social science equivalent. Mr. Mangus.

A detailed study of the environmental factors surrounding rural people and the relation of these factors to their behavior. Particular consideration is given to the mental and social characteristics commonly attributed to country people.

610. Agricultural Credit. Three credit hours. Spring Quarter. Mr. Wertz.

The credit needs of agriculture and how they are met.

612. Prices of Farm Products. Three credit hours. Spring Quarter. Three lectures each week. Mr. Wertz.

A study of the prices of farm land and of farm products. Adjusting the farm business to meet price fluctuations.

613. Marketing Farm Products. Five credit hours. One Quarter. Autumn and Spring. Five lectures each week. Mr. Henning, Mr. McBride.

A study of local and terminal marketing services and agencies involved in the marketing of farm products.

***614. Business Management in Agricultural Marketing.** Three credit hours. Winter Quarter. Two lectures and one laboratory period each week. Given in alternate years. Mr. Henning.

A detailed study of representative agricultural marketing agencies, including their problems of administration, finance, selling, transportation and warehousing.

615. Land Economics. Three credit hours. Spring Quarter. Mr. Sitterley.

The uses and classification of rural land. The public interest in a land policy.

701. Special Problems. Three to fifteen credit hours, given in units of three or five hours a Quarter for one or more Quarters. Autumn, Winter, Spring. General prerequsites must include at least eight hours of work in the department and the consent of the instructor must be obtained. Mr. Falconer, Mr. McBride, Mr. Henning, Mr. Wertz, Mr. Sitterley, Mr. Hauck, Mr. Mangus.

This course is for students who desire to work out special problems in the field of rural economics and rural sociology.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

802. Rural Economics Seminar. One to three credit hours. Winter and Spring Quarters. Consent of the instructor must be obtained. Mr. Falconer.

950. Research in Rural Economics. Autumn, Winter, and Spring Quarters. Opportunity is offered to carry on special research in agricultural economics and rural sociology. Mr. Falconer, Mr. Henning, Mr. McBride, Mr. Wertz, Mr. Mangus, Mr. Hauck.

* Not given in 1940-1941.

SCHOOL ADMINISTRATION

(See Education)

SOCIAL ADMINISTRATION

Office, 303 Social Administration Building

PROFESSORS STILLMAN, HAGERTY, MARK, PATERSON, AND RAYMOND, ASSOCIATE PROFESSORS DENUNE AND BATCHELOR, ASSISTANT PROFESSORS JONES, BLACKBURN, REIMERS, AND JOHNSON, MR. CORNELL

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

619. Historical Development of Social Case Work. Three credit hours. One Quarter. Autumn and Winter. Mr. Raymond.

A study of the forms which social work has taken in the past with special emphasis upon the developments of the last century, which have culminated in present forms and functions of family, social work agencies, and those dealing with transient and homeless individuals.

620. Community Planning for Child Care. Three credit hours. One Quarter. Winter and Spring. Mr. Raymond.

An examination of contemporary programs of child care and protection; regulatory functions of the state in relation to children in their own homes, in institutions, or in foster homes.

626. Penology. Three credit hours. Autumn Quarter. General prerequisites must include Sociology 625. Mr. Hagerty.

The evolution of the methods of criminal procedure with an analysis and criticism of present-day methods. The organization and administration of penal institutions. As visits will be made to courts, jails, and prisons, students who take this course should be free to make these visits Saturday mornings.

627. The Juvenile Court. Three credit hours. Winter Quarter. General prerequisites must include Sociology 625 or Social Administration 626. Mr. Hagerty.

The organization and administration of juvenile courts. The evolution of the juvenile courts and their methods of procedure. The causes of their success and failure.

638. Field Methods in Social Investigation. Five credit hours. One Quarter. Autumn and Spring. Three class meetings and four hours in field or laboratory each week. Miss Mark, Mr. Blackburn, Mr. Cornell.

Statistical investigation of some phase of social life of the city. Drafting and using of schedules. The statistical interview. Editorial processes. Drafting of tables. Tabulation.

639. Social Statistics. Five credit hours. One Quarter. Winter and Spring. Three class meetings and two two-hour laboratory periods each week. Miss Mark, Mr. Blackburn, Mr. Cornell.

The interpretation of statistical data. Averages and ratios, measures of dispersion, graphic presentation, statistical text. A study of the fields of population and vital statistics, statistics of dependency, delinquency, and standard of living.

642. Case Recording. Three credit hours. Winter Quarter. Miss Jones.

A study of case history writing and office methods of social case work agencies.

646. Group Work and Recreational Agencies. Four credit hours. Winter Quarter. General prerequisites must include Sociology 645. Mr. Batchelor.

The promotion and organization of public and semi-public agencies. The administrative control of playgrounds, social centers, clubs, and other non-commercial agencies. The coordination of the recreational facilities of the community. Methods and means of control of commercialized recreation with special reference to American cities and towns.

647. Leadership and Direction of Group Activities. Three credit hours. Winter Quarter. Lectures, readings, practical demonstrations, field work. General prerequisites must include Sociology 645. Mr. Batchelor.

Consideration of problems of leadership and practice in methods of directing of boys' and girls' clubs and adult leisure groups. The use of active and quiet games, stories, music, dramatics, folk recreation, and crafts, including demonstrations, field trips, field practices, and instruction in the various techniques.

650. Contemporary Group Work Methods. Five credit hours. Spring Quarter. General prerequisites must include Sociology 645 and Social Administration 646. Mr. Batchelor.

A study of the organization and methods of the principal agencies engaged in group work with adolescents, such as Boy Scouts, Camp Fire Girls, Girl Scouts, Settlements, Young Men's Christian Association, and Young Women's Christian Association. The principal part of the instruction will be given by specialists from these various agencies.

657. Welfare Problems in Rural Communities. Four credit hours. Winter Quarter. Mr. Denune.

A consideration of health, child welfare, dependency, defectiveness, delinquency, and recreation. This course is designed to give rural teachers, ministers, and social workers a knowledge of the welfare problems which exist in rural communities and the methods by which they are being approached by rural workers.

668. Community Organization. Three credit hours. Spring Quarter. Three class meetings each week. Mr. Raymond.

An analysis of the social administrative problems with which the local community has to deal, their interrelations and their sources in local conditions. Local community agencies and methods of coordinating their resources.

670. Community Health Organization. Three credit hours. Winter Quarter. Mr. Paterson.

The aims and historical developments of public health, with particular reference to England and the United States of America.

672. Medical Aspects of Social Work. Three credit hours. Winter Quarter.

A presentation of the social aspects of preventable diseases; the techniques of securing and using expert medical information; the clinical interpretation of specific disease problems, growth and nutrition; pregnancy and medical procedures.

673. Psychiatric Aspects of Social Work. Three credit hours. One Quarter. Autumn and Spring. Mr. Reimers.

An introductory presentation of those aspects of modern psychiatry which have found widespread usefulness in social work practice. Attention appropriate to the social worker is given to the development and functioning of emotional life from infancy to adulthood and to the dynamics of behavior, whether socially acceptable or not.

675. Field Work. One to fifteen credit hours. One Quarter. Summer, Autumn, Winter, Spring. All instructors.

Practical work in the fields of family and child welfare, penology, health, industry, recreation, group work, and community organization, under the supervision of organizations in these fields and the instructor.

676. The Field of Social Work. Two credit hours. Autumn Quarter. Mr. Batchelor.

An introduction to contemporary social work, its objectives and processes; its relationship to other social forces; its historical development.

679. Legal Aspects of Social Work. Three credit hours. One Quarter. Autumn and Winter. Mr. Raymond.

Discussion of the law as a means of social control; study of case law and statutes relating to those fields of the law which are of greatest concern to the social worker; the legal aid movement in the United States.

***690. Social Case Work.** Three credit hours. Autumn Quarter. Special course open to workers, recommended by the Franklin County Relief Administration and approved by the department, who qualify for ranking as juniors or above at the University.

Principles, methods, and technique of social treatment with particular reference to the administration of unemployment relief.

Not open to students who have credit for Social Administration 695.

695-696. Social Case Work. Five credit hours. 695, Autumn and Winter; 696, Winter and Spring. Open by permission of the instructor. Mr. Raymond, Miss Jones.

An introductory course in the methods of social case work with particular reference to the family welfare field.

* Not given in 1940-1941.

697. The Case Method in Group Work. Three credit hours. Winter Quarter. General prerequisites must include Social Administration 695.

The application of the case method to organized group work. The techniques of interviewing, recording, diagnosing, interpretation of data, and treatment, with particular reference to the needs of group work students. Lectures, discussions, and field work.

700. Special Problems. One to five credit hours. All Quarter. Permission of instructor must be obtained.

Individual study in some field of social interest.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

813. The Community Chest Movement. Four credit hours. Autumn Quarter. Mr. Stillman.

Origin, development and present status. The business end of a Community Chest and its place in the field of welfare finance. Study of and report upon the Columbus Community Fund campaign for funds. Analysis of paper organizations of Community Chests of other cities.

814. Contemporary Social Work. Four credit hours. Winter Quarter. General prerequisites must include Social Administration 813. Mr. Stillman.

An analysis of programs as actually operative in American communities. Methods of coordination in social work. The Community Chest and Councils of Social Agencies. Making a community program. Functional groupings in the field of social work.

†815. Interpretation of Social Work. Four credit hours. General prerequisites must include Social Administration 813 and 814. Mr. Stillman.

The place of education in a social work program. The message and the method of educational publicity.

816-817. Social Case Work. Four credit hours. Autumn and Winter Quarters. Mr. Reimers.

The principles and methods of social case work and their application; case records used for study and discussion.

835. The Social Worker and Community Groups. Three credit hours. Autumn Quarter. Mr. Stillman.

The social work executive as a specialist in the field of community planning.

836. National Social Work Agencies and Local Programs. Three credit hours. Winter Quarter. General prerequisites must include Social Administration 813. Mr. Stillman.

Their historical development and influence. Contractual relations. Promotion. Education. Specialism. Standards.

†837. Budgeting Community Social Work. Three credit hours. General prerequisites must include Social Administration 813 and 814. Mr. Stillman.

Principles and methods of budgeting. The budget in relation to money raising and social planning.

838. Social Case Work. Three credit hours. Autumn Quarter. Mr. Raymond.

An analysis of present trends in family case work. Consideration of the techniques of diagnosis and treatment. The significance of present-day relief practices.

839. Interviewing in Social Case Work. Three credit hours. Spring Quarter. General prerequisites must include Social Administration 695-696 and permission of the instructor must be obtained. Mr. Reimers.

A course to assist the student in acquiring facility in interviewing. Through case material and practice a study of ways in which the skill of social workers is used.

840. Probation and Parole. Three credit hours. Autumn Quarter. General prerequisites must include two courses in criminology. Mr. Hagerty.

The individual treatment of the delinquent. The organization of probation and parole. The probation and parole systems of the different states. A critical analysis of the methods of probation and parole.

† Not given during the academic year, 1940-1941.

†841. **Public Welfare Administration.** Three credit hours.

Principles of the administration of public welfare. Emphasis on emergency relief administration, budgetary procedure, social planning and personnel.

*842. **Public Welfare Administration.** Three credit hours. Autumn, Winter, and Spring Quarters. General prerequisites must include Social Administration 841. Open only to graduate students in Social Administration.

Provisions for public assistance including consideration of the administration of the poor law, aid to mothers, and for the aged, and unemployment assistance.

843. **The Administration of Social Work Agencies.** Three credit hours. Autumn Quarter.

An introduction to the basic factors in the administration of social agencies.

845-846. **Methods of Social Investigation.** Four credit hours. Autumn and Winter Quarters. Required of candidates for advanced degrees in social administration who have not had equivalent work. Miss Mark, Mr. Blackburn.

A course designed to prepare students to do independent social research involving the simpler statistical methods. Students will undertake a class project involving the collection of data and analysis of the results.

847-848-849. **Research in Penology.** One to four credit hours. Autumn, Winter, and Spring Quarters. Open on consent of the instructor. It is assumed that the student who takes this course shall have had one year's work in criminology and penology. Mr. Hagerty.

850. **Social Case Work in Penology.** Three credit hours. Winter Quarter. General prerequisites must include Social Administration 840. Mr. Hagerty.

A critical analysis of the treatment of cases of delinquents and criminals.

853. **Administrative Relationships in Group Work.** Three credit hours. Spring Quarter. Mr. Batchelor.

A study of methods of coordination of voluntary group work agencies with public education and public recreation agencies. Consideration of the elements involved in the correlation of various units functioning within each of these three fields.

855. **Public Recreation: Its Organization and Administration.** Three credit hours. Spring Quarter. Mr. Batchelor.

Consideration of public provision for the use of leisure with particular reference to methods of organization and administration of playgrounds, community centers and school centers.

The content of this course will be arranged by consultation between the Departments of Social Administration and Physical Education.

857. **Administration of Statistical Projects.** Three to five credit hours. Autumn Quarter. General prerequisites must include Social Administration 845-846 or equivalent. Miss Mark, Mr. Blackburn.

The principles and methods of administration. Organization of office and field work, standards of personnel, methods of control, budgetary problems. Students will participate in supervision of a project.

858-859. **Planning Statistical Studies.** One to three credit hours. Winter and Spring Quarters. General prerequisites must include Social Administration 845-846 or equivalent. Miss Mark, Mr. Blackburn.

Analysis of selected subjects for field investigation. Delimitation of inquiry; determination of sampling method; drafting of outline of report, skeleton tables, schedule and instructions or questionnaire, coding system and punch card.

860. **Advanced Case Work.** Four credit hours. One Quarter, Autumn and Spring. General prerequisites must include Social Administration 695 and 696 or equivalent and experience either in field work or as a member of the staff of a case work agency and approved by the Department. Mr. Reimers.

Application of case work to the treatment of individuals with behavior difficulties. Formulation of treatment plans. Case materials extensively used.

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

861. Case Work Treatment. Four credit hours. Winter Quarter. General prerequisites must include Social Administration 860. Mr. Reimers.

Consideration of some basic factors involved in the carrying out of case work treatment plans. Deals with the differential coordination in each case of the client's needs, the case worker's abilities, and her agency's limitations. Case material extensively used.

950. Research in Social Administration. Autumn, Winter, and Spring Quarters. All instructors.

Individual projects selected and prosecuted in consultation with the instructor.

SOCIOLOGY

Office, 111 Commerce Building

PROFESSORS LUMLEY, HAGERTY, NORTH, AND MARK, ASSOCIATE PROFESSORS DENUNE, BATCHELOR, AND COOK, ASSISTANT PROFESSOR GILLIN

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

600. The Modern Family. Four credit hours. Spring Quarter. Mr. Denune.

An examination of the results of the impact of modern culture upon the family with special reference to such factors as size of family, member relationships, economic problems, divorce, desertion, status of women.

601. Types of Family Organization. Four credit hours. One Quarter. Autumn, Winter, Spring. Mr. Denune.

A survey of family organizations from primitive times to the present; an analysis of the factors that entered into their development.

604. Race Problems. Three credit hours. Autumn Quarter. Mr. Cook.

Contemporary adjustment problems of Negro, immigrant, and Jew. Racial and national differences, population shifts, economic adjustments, health, family life, citizenship, leisure pursuits, religion, and education.

Not open to students who have credit for Sociology 608.

605. Race Relations. Three credit hours. Winter Quarter. Mr. Cook.

A study of majority and minority group relations, ideology of race, interracial conflicts, institutional changes, personality disorganization, planned assimilation, acculturation as a natural process.

607. Race Contacts and Culture Conflicts. Four credit hours. Spring Quarter. Mr. Gillin.

Problems arising from contact of culture, with particular attention to the acculturation of preliterate peoples by European civilization.

610. The Standard of Living. Four credit hours. Spring Quarter. Four class meetings each week. Miss Mark.

A consideration of the content of the various standards of living in American society, their economic and social significance. Problems in family budget and retail buying.

612. Primitive Social Organization. Three credit hours. Autumn Quarter. Three class meetings each week. Mr. Gillin.

The development of social institutions, based upon an intensive study of the systems of social relationships among a representative selection of primitive peoples.

613. Primitive Religion. Three credit hours. Winter Quarter. Consent of the instructor must be obtained. Mr. Gillin.

An examination of the fundamental religious beliefs and practices of primitive peoples.

***614. Social Ecology.** Four credit hours.

Population patterns and changes, ecological processes, institutional organization and disorganization, community zones, sub-areas and their social characteristics.

618. Poverty. Three credit hours. Winter Quarter. Mr. Hagerty.

Extent, nature, and causes of poverty. Outlines of a program of prevention. The relation of the standard of living to social welfare. The relation of minimum wage laws to poverty.

* Not given in 1940-1941.

622. Human Nature and Social Adjustment. Three credit hours. Autumn Quarter. Mr. Cook.

Nature of human nature; process of socialization; social change and individual demoralization; social roles in conflict situations; re-direction of social activity.

***623. Collective Social Phenomena.** Three credit hours. Spring Quarter. Mr. Cook.

Social unrest and mass movements; elemental forms of collective action, transiency, contagions and epidemics; group behavior, orgiastic, and institutional; mass movements and their institutionalization; leadership in social planning.

625. The Criminal. Three credit hours. One Quarter. Autumn and Spring. Mr. Hagerty.

The social, economic, and physiological causes of crime. The changing character of crime as modified by the legal code. Types of criminals, the instinctive, habitual, professional, etc. The classical and positive schools of criminology. The relation of feeble-mindedness and degeneracy to crime. Juvenile crime, its causes and prevention.

629. Principles of Sociology (Advanced Course). Four credit hours. Autumn Quarter. General prerequisites must include thirty hours in not more than two allied subjects. Mr. North.

A critical examination of the more fundamental principles and concepts of modern scientific sociology.

645. Leisure and Recreation. Four credit hours. One Quarter. Autumn and Spring. Mr. Batchelor.

The sources of leisure in early and modern society. The social significance and uses of leisure. The social functions of play. Historical aspects of play. The recreation problem of modern communities from the standpoint of control and of public provision.

656. Rural Social Institutions. Four credit hours. Autumn Quarter. Mr. Denune.

The problems of health, recreation, social intercourse, housing, child welfare, dependency, defectiveness, and delinquency in American rural communities and small towns. The agencies and organizations dealing with these problems.

665. Social Order and Social Control. Three credit hours. Autumn Quarter. Textbooks, lectures, papers, and discussions. Mr. Lumley.

A study of the various features of social control and the social order; the chief control devices or methods; agents, both private and public; institutional pressures; disruptive factors; the nature of social order. Additional readings for graduate credit.

666. Cultural Change. Three credit hours. Winter Quarter. Textbooks, lectures, papers, and discussions. Mr. Lumley.

A systematic study of the methods of social evolution such as variation, selection, transmission, adaptation. Additional readings for graduate credit.

667. Social Progress. Three credit hours. Spring Quarter. Textbooks, lectures, papers, and discussions. Mr. Hagerty.

A study of the various theories and the criteria of social progress. Extra readings for graduate credit.

†674. Archaeological Training Expedition. Eight credit hours. Full time in expedition camp. General prerequisites must include courses in anthropology and archaeology. Mr. Gillin, Mr. Morgan, and Museum staff.

Qualified students registering for this course will join the joint expedition of the Ohio State University and the Ohio State Museum, which will be engaged in excavating prehistoric sites in Ohio. Instruction and experience will be provided in every phase of archaeological field work. Prospective students should consult Mr. Gillin and Mr. Morgan.

676. Social Classes. Four credit hours. Winter Quarter. Four class meetings each week. Mr. North.

Class distinctions as a phase of social differentiation. The origin and characteristics of social classes. The significance for modern society of class consciousness, class struggle, and social mobility.

677. Social Organization in the Nation State. Four credit hours. Spring Quarter. Four class meetings each week. Mr. North.

An examination of Democracy, Capitalism, Communism, and Fascism, as types of social

* Not given in 1940-1941.

† Not given during the academic year, 1940-1941.

organization. Special emphasis is given to the impact of these forms of social organization upon such aspects of culture as the status of the individual, women and the family, education, art, religion, and the treatment of minority groups.

678. The School's Community. Three credit hours. Spring Quarter. Mr. Cook.

Study of local area factors and conditions influencing school structure, problems and policies. Class discussion, field trips, class projects, and illustrative community surveys.

679. School as a Social Institution. Three credit hours. Spring Quarter. Mr. Cook.

School as a population aggregate; the institutional pattern; the culture of the young; group behavior processes; natural and imposed controls.

700. Special Problems. One to four credit hours. Autumn, Winter, and Spring Quarters.

Individual study in some field of social interest.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

All candidates for degrees are required to register for Sociology 800 or Social Administration 845-846.

800. Sociological Research. Four credit hours. Winter Quarter. General prerequisites must include a course in elementary social statistics. Mr. Cook.

Systematic study of current research techniques with emphasis on the non-statistical. Organized sociological research; local area studies; opinion and attitude tests; personal and group life histories; institutional growth cycles; social experimentation, research presentation.

801-802-803. History of Sociological Thought. Two credit hours. Autumn, Winter, and Spring Quarters. One session each week. Readings, reports, lectures, and discussions. Mr. Lumley.

A survey of the most important literature of sociological theory, preceded by an examination of the writings of the Utopians, the philosophers of history and the social reformers.

805-806-807. American Sociological Theory. Two credit hours. Autumn, Winter, and Spring Quarters. One session each week. Readings, reports, lectures, and discussions. Mr. Hagerty.

An intensive study of the theories concerning the origin, development, forms and nature of society, advanced by the leading American sociologists.

820. Seminar in Anthropology. Two credit hours. Autumn, Winter, and Spring Quarters. Mr. Gillin.

***827. Nationality and Nationalism.** Four credit hours. Autumn Quarter.

A survey of the religious, economic, political, and social backgrounds which underlie the contemporary development of national attitudes.

861. Seminar in Social Processes and Structures. Four credit hours. Autumn, Winter, and Spring Quarters. Mr. North.

The areas covered will vary from year to year.

862-863. Social Planning and Reconstruction. Four credit hours. Autumn and Winter Quarters. Mr. North.

An examination of the nature of the problems and methods involved in efforts to effect purposive change. The methods and agencies of change. Gradualism and Revolution as modes of social reconstruction. The place of values in choosing goals of social effort. Critical examination of the more prominent efforts at social planning now in progress in America and elsewhere.

900. Contemporary Sociological Literature. One to four credit hours. Autumn, Winter, and Spring Quarters. Mr. Lumley, Mr. North, Mr. Denune, Mr. Gillin, Mr. Cook.

A critical examination of recent books and periodicals.

950. Research in Sociology. Autumn, Winter, and Spring Quarters. Criminology, Mr. Hagerty; social movements, their history, organization, methods, Mr. North; history of sociological thought, social control, social evolution, Mr.

* Not given in 1940-1941.

Lumley; school and community relations, race problems, Mr. Cook; rural social institutions, Mr. Denune; anthropology, Mr. Gillin; the family, Mr. Denune; leisure and recreation, Mr. Batchelor.

Individual projects selected and prosecuted in consultation with the instructor.

SOILS

(See Agronomy)

SPANISH

(See Romance Languages and Literatures)

SPECIAL EDUCATION

(See Bureau of Special and Adult Education)

SPEECH

Office, 113 Derby Hall

PROFESSORS KETCHAM, RUSSELL, AND WILEY, ASSISTANT PROFESSORS MASON, BAHN, EMSLEY, MOSES, AND TIMMONS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

University requirements for any of the courses in this group specify a prerequisite of either (a) thirty Quarter hours in not more than two allied subjects, or (b) ten hours in such allied subjects and ten hours in Speech.

601. The Forms of Public Address. Five credit hours. Spring Quarter. Mr. Ketcham.

A study of special methods by which speech is made clear, interesting, and forceful. Practice in using these methods in the preparation and delivery of the different forms of public address, including nominating, dedicatory, eulogistic, after dinner, and general academic, political, and business speeches. A broad view of language training is given with the object of increasing the student's command of thought in writing and talking as well as in public speaking.

618. Historical American Phonetics. Three credit hours. Winter Quarter. Three recitations each week. Permission of the instructor is required. Mr. Emsley.

General American pronunciation is studied in its historical background, and in comparison with eastern American, southern American, and accepted standard British. The alphabet of the International Phonetic Association, dictionaries, and records are used. Laboratory practice includes special work with dialects for use in dramatics or linguistic studies.

630. General History of Speech and Rhetoric. Three credit hours. Autumn Quarter. Mr. Wiley.

Historical development of speech designed to give the student a substantial background for the understanding of oral language problems. Medieval and ancient rhetoric surveyed in relation to present problems in public address. Though mainly concerned with speech content, composition, and style, the course will also review the theory and practice of speech presentation, particularly in recent periods.

633. History of the Theatre. Three credit hours. Autumn Quarter. General prerequisites must include a course in Shakespeare. English 670 is also recommended. Mr. Bahn.

A study of the ways in which changing forms in the theatre have determined the form of the written play and the methods of presentation.

635. Dramatic Criticism. Three credit hours. Winter Quarter. English 670, 676, or 677 must be included in the general prerequisites or taken concurrently. Mr. Bahn.

The development of the theory of dramatic technique in Europe from Aristotle to the present time as seen in the writings of playwrights and in criticisms of their work.

637. Playwriting. Five credit hours. Spring Quarter. English 670, 676, or 677 must be included in the general prerequisites or taken concurrently. Mr. Timmons.

Lectures and progressive exercises in dramatic technique. Particular attention to the one-act play. Opportunity for the projection of successful scripts under supervision of the author.

656. Visual Hearing Techniques. Five credit hours. Winter Quarter. Miss Mason.

Speech and hearing problems. A course designed to assist teachers, clinical psychologists, nurses, and medical students to better understand the speech and hearing needs of the deaf and hard of hearing cases referred to them. Clinical and laboratory practice afforded those interested in the practical applications of methods and technical procedures.

660. Stagecraft. Five credit hours. Autumn Quarter. Three hours lecture and four hours laboratory each week. Mr. Bahn.

Approved practice in the construction of the common forms of stage scenery. Workshop problems in building and painting sets. Stage lighting units, their construction and manipulation. Preparation of light plots and cue sheets. Practical repetition of lay-outs that have been successful in actual productions.

664. Stage Direction. Five credit hours. Autumn Quarter. Three lecture and four laboratory hours each week. English 670, 676, or 677 must be included in the general prerequisites or taken concurrently. Mr. Timmons.

Study and practice in the methods by which the values of the written drama are translated to the stage in terms of acting, stage business, grouping, and movement. Control of attention, emphasis, tempo, smoothness, and rhythm as objectives in group rehearsal.

665. Play Production. Five credit hours. Winter Quarter. Three lecture and four laboratory hours each week. General prerequisites must include Speech 664. Mr. Timmons.

Study and practice in the methods by which all the arts of the theatre are coordinated to produce the completed performance. An additional study of the individual methods of outstanding producers in the contemporary theatre.

692. Clinical Practice in Speech Correction. Five credit hours. Autumn Quarter. Mr. Russell.

Actual clinical practice in speech correction and training of visual hearing. The student will be given opportunity to study and work with a wide range of speech and hearing cases at the Children's Hospital, in the University Clinic, the Freshman Week Health Line. To make arrangements he should, therefore, if possible communicate with the department well before the opening of the Quarter.

694. Speech Disorders Survey. Five credit hours. Winter Quarter. General prerequisites must include course credit equivalent to a major in speech or allied departments, and a background satisfactory to the instructor. Mr. Russell, Miss Mason.

This course is designed to serve the needs of those concerned solely with minor speech correction, such as those entering the field of special education, or college, high school, and elementary school teaching. It will deal primarily with phonetic substitutions; foreign accent; lisping; nasal, strident, harsh, and muffled voices; work with the deaf and hard of hearing; and other similar speech, voice, and hearing deviations from the cultured social norm.

700. Minor Problems in Speech. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Conference, library, and laboratory work. General prerequisites must include satisfactory courses in the field of the problem undertaken. A student may repeat this course and may spend all or any part of his time on it during the Quarter. Departmental staff.

This course is designed to permit any properly qualified person to avail himself of the library and laboratory facilities of the department for carrying out a minor or preliminary investigation or for adding to his knowledge and technique in some Speech subject.

The student may exercise entire freedom in his choice of instructor to conduct his work in this course.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

A candidate for the degree of Doctor of Philosophy in Speech shall hold a bachelor's degree from an accredited institution of higher learning and shall show the ability to speak and write effectively. This ability shall be manifested in the use of a cultured diction, in the capacity to organize facts and ideas in a purposeful way, and in acquaintanceship with good rhetorical usage. These qualifications shall be demonstrated to the satisfaction of the department in a formal oral and written examination for which the candidate shall make written application early in his first Quarter in residence. Deficiencies revealed must be made up by the candidate in such manner as may be specified by the department. This may entail a longer period of residence.

The major areas of specialization within the department are: speech pathology, speech education, phonology and dialectology, laboratory speech science; play writing, play production, dramatic criticism; ancient and modern rhetorical theory, history, and criticism. Students contemplating graduate work in speech should consult with the chairman of the department regarding a complete program which will include work in allied departments appropriate to the student's field of specialization.

811. Survey of Experimental Techniques. Five credit hours. Autumn Quarter. Mr. Russell.

This course is intended to give the advanced student in speech science, information and practice in carrying through precise research techniques of varying kinds, with a view to their application in the problem he proposes to undertake. It will involve the use of mechanical, electrical, photographic, acoustic, and other precision apparatus and techniques as applied to speech.

816. Speech Pathology. Five credit hours. Spring Quarter. General prerequisites must include Speech 692 and courses in allied fields satisfactory to the instructor.

The serious and major speech impairments, traceable specifically to disease, mental inhibition, neuroses, psychoses, physiological mal-development or impeding growths, traumatic interference, etc. Stuttering and stammering, aphasia, aphonia, cleft-palate speech, disturbances traceable to mental retardation, auditory asthenia of varying kinds, spastic speech, etc. Types, degrees, causes, and consequences. Techniques of training involved.

824. Pronunciation Norms. Five credit hours. Spring Quarter. General prerequisites must include ten hours in speech and ten hours in the English department satisfactory to the instructor. Mr. Emsley.

The norms of cultured American speech, deviations therefrom, and their historical origin. Methods of recording and analyzing the same. Field work and laboratory practice.

844. Theatrical Art. Five credit hours. Winter Quarter. One two-hour session each week.

The subject for each Quarter will be announced in advance.

850. The Little Theatre. Five credit hours. Spring Quarter. One two-hour session each week. Mr. Timmons.

The course has two phases: (1) A general analysis of little theatre and community theatre organization and management. (2) An intensive study by each student of the history, organization, and special problems of a selected little theatre.

870. Studies in Ancient and Modern Rhetoric. Three credit hours. Winter Quarter. Mr. Wiley.

An historical survey of rhetorical theory from the fifth century B. C. to the present time. Special emphasis will be laid upon general trends in rhetorical theory as a background for the understanding of modern concepts of rhetoric. Consideration also will be given to the application of rhetorical theory to the critical analysis of classical and modern examples of great public addresses.

881-882-883. Studies in the Nature and Structure of Oral Words. Two credit hours. Autumn, Winter, and Spring Quarters. Students who enroll in 881 are expected to complete the sequence. Each course is a prerequisite to the succeeding course. Mr. Ketcham.

A consideration of spoken words as an evidence of man's early efforts to store and communicate meanings. Analysis on the basis of word-symbols, word concepts, and real words. The relation of word-concepts to the actuality which they reflect. Possible applications in speech problems of the various relationships between words and consciousness.

950. Research in Speech. Autumn, Winter, and Spring Quarters. Library, conference, and laboratory work. General prerequisites must include acceptable courses in the chosen field of research. The student may spend a part or all of his time on research work.

Research work in speech is done under the direction of those members of the staff in whose field the student's specialization lies.

SURGICAL RESEARCH

Office, 203 Kinsman Hall

PROFESSOR CURTIS, MR. HAMILTON, MR. ZOLLINGER

FOR GRADUATES

900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Surgical Research. All Quarters. Laboratory, dispensary, or clinic, library and conferences. An opportunity for qualified students to investigate surgical principles and surgical diseases. Permission of the instructor is required. Mr. Curtis, Mr. Hamilton.

Particular opportunity is offered for the investigation of thyroid diseases, of iodine and calcium metabolism, of certain bone diseases, of gastro-intestinal disease, of the surgical aspects of tuberculosis, and of the pathological physiology of the spleen. The amount of time spent in research varies. At times the student may participate in the current research activities of the staff.

SURVEY COURSES

PROFESSORS HENDERSON, LEIGHTON, AND SPIEKER, ASSOCIATE PROFESSOR ZORBAUGH, DEAN GAW, MR. WATERS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. Prerequisite, permission of the instructor in charge who will decide in each individual case whether the student has had the necessary training to profit from the course.

605. Foundations of Contemporary Civilization. Five credit hours. One Quarter. Autumn, Winter, Spring. Five meetings each week. Mr. Leighton, Mr. Waters.

This course is designed for all students majoring in subjects falling within the fields of biological and inorganic sciences, mathematics and psychology. It is designed to afford the mature student some insight into the progress of thought in a great province of life to which he has given relatively little attention during his course. The course deals with the changes of thought in religion, ethics, social and political philosophy in relation to the general intellectual and social changes of modern civilization. It concludes with a brief discussion of the chief problems of our present civilization.

608. Development of Modern Science. Five credit hours. One Quarter. Autumn and Winter. Five meetings each week. Mr. Henderson, Mr. Spieker.

This course is designed especially for students who have not majored in science. Its purpose is to give the non-science student a general view of the historical development of scientific ideas, and to dwell upon the nature and validity of scientific hypotheses and theories from a scientific point of view. The course is also well adapted to assist the prospective teacher of science in greatly broadening his scientific foundations.

664. Student Economic Problems and the Adviser. Three credit hours. One Quarter. Autumn and Spring. One three-hour session each week. General prerequisites must include an elementary course in economics or the consent of the instructor must be obtained. Miss Zorbaugh.

A course, mainly of the discussion type, for advisers of students in colleges, universities, and high schools and is open to both men and women.

An examination of the functions of a dean or counselor of students. Fundamental student interests and problems, both short-time and long-time, since they are wholly or partly economic, will be studied in the light of economic principles. A philosophy will be worked out which envisions maximum efficiency in students as both producers and consumers. Provision is made for actual experience in counseling students under supervision of the instructor.

It is advisable to supplement this course by Survey 665. Economics 645 is also recommended.

Not open to students who have credit for Psychology 664.

665. Principles of Psychology for Advisers. Three credit hours. One Quarter. Autumn and Winter. One three-hour session each week. General prerequisites must include fundamental courses in psychology or the consent of the instructor must be obtained. Mrs. Gaw.

This course is for advisers of students in colleges, universities, and high schools and is open to both men and women.

Students may have actual experience in advising younger students under the supervision of the Dean of Women. They will be taught how to advise concerning the scholastic and social orientation of students, and the use and interpretation of records and scholarship as bearing on the personality of the student.

It is advisable to supplement this course by Survey 664.

VETERINARY ANATOMY

Office, 204 Veterinary Laboratory

PROFESSOR GROSSMAN, MR. FITZGERALD, MR. MAUGER

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

601. Advanced Veterinary Anatomy. Three to five credit hours. One Quarter. Autumn, Winter, Spring. General prerequisites must include a course in the topographic anatomy of domestic animals. Mr. Grossman.

608. Histologic Technique. Two to five credit hours. One Quarter. Autumn, Winter, Spring. Laboratory work, three hours for each credit hour. General prerequisites should include courses in the histology and embryology of the domesticated animals. Students electing this course should consult with the instructor in charge. Mr. Grossman, Mr. Fitzgerald, Mr. Mauger.

The course deals with the examination of the tissues with the aid of the microscope. The important methods in the preparatory steps required in collecting specimens, fixation, embedding, sectioning, staining, and mounting are considered.

VETERINARY CLINICS

Office, 115 Veterinary Clinic

DR. W. F. GUARD, Director of Clinics
DEAN O. V. BRUMLEY, Adviser
MISS R. AZELIA WHITE, Bookkeeper

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

801-802-803. Special Problems in Clinics. Three to ten credit hours. All Quarters. Mr. Guard and clinical staff.

A course intended to give the student more intensive clinical experience.

810. Advanced Clinical Technique. Three to ten credit hours. All Quarters. Mr. Guard and clinical staff.

A course intended to give the student more intensive clinical experience.

VETERINARY MEDICINE

Office, 103 Veterinary Laboratory

PROFESSORS BRUMLEY, SCHALK, HOBBS, AND DONHAM

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

626. Special Problems in Veterinary Medicine. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Brumley, Mr. Schalk, Mr. Hobbs, Mr. Edgington, Mr. Donham.

VETERINARY PARASITOLOGY

Office, 4 Veterinary Laboratory

PROFESSOR REBRASSIER, MR. JAMES

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

623. Advanced Veterinary Parasitology. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Rebrassier, Mr. James.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

826. Special Parasitological Problems. Five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Rebrassier, Mr. James.

VETERINARY PATHOLOGY

Office, 135 Veterinary Clinic

PROFESSOR GOSS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

610. Pathology Technique. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Laboratory work, three hours for each credit hour. Mr. Goss.

Practice in the methods of laboratory diagnosis, consisting of collecting the specimens, their fixation and embedding, and the sectioning of such tissues, together with practice in laboratory diagnosis and the recognition of disease processes in tissues.

615. Advanced Special Pathology. Two to five credit hours. Each Quarter. Autumn, Winter, Spring. Laboratory work, three hours for each credit hour. General prerequisites must include Veterinary Pathology 610. Mr. Goss.

An advanced course in the pathology of infectious diseases with special reference to anatomical and microscopical lesions and methods of diagnosis together with detailed studies of the lesions of specific diseases under consideration.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

801. Special Anatomical Pathology. Three to ten credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Goss.

Special problems in gross and microscopic pathology with regard to the accommodation of the course to particular projects which may be given due consideration.

805. Special Bovine Pathology. Three to ten credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Goss.

This is to accommodate those students doing graduate work in some special fields of bovine pathology. The selection of projects is quite variable, allowing for special problems in this field.

815. Special Poultry Pathology. Three to ten credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Goss.

This course allows for the study of poultry diseases with specialization in any pathological processes concerned with poultry diseases.

VETERINARY PHYSIOLOGY AND PHARMACOLOGY

Office, 203 Veterinary Laboratory

ASSISTANT PROFESSOR ASHCRAFT

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

700. Minor Problems in Physiology and Pharmacology. Three to fifteen credit hours. Autumn, Winter, and Spring Quarters. Designed for qualified students who wish to begin research. Permission of department chairman is required for registration. Mr. Ashcraft.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

950. Research in Physiology and Pharmacology. Autumn, Winter, and Spring Quarters. General prerequisites must include courses in comparative physiology or pharmacology, or equivalent courses and the permission of the department chairman. Mr. Ashcraft.

The department is equipped to supervise research dealing with special problems in physiology and pharmacology.

VETERINARY PREVENTIVE MEDICINE

Office, 202 Veterinary Laboratory

PROFESSOR SCHALK

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

650. Special Problems in Preventive Veterinary Medicine. Two to five credit hours. One Quarter. Autumn, Winter, Spring. Mr. Schalk.

Special courses can be pursued in Genetics, Environmental, Biologic and Food Hygiene.

VETERINARY RESEARCH

Office, Animal Disease Laboratories, Reynoldsburg, Ohio

PROFESSORS EDGINGTON, BRUMLEY, SCHALK, AND REBRASSIER, MR. JAMES, MR. HELWIG

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

The departmental laboratories wherein the major portion of the active work is conducted are located near Reynoldsburg, about ten miles from Columbus. Here well-equipped laboratories and facilities for housing and isolation of experimental animals, including poultry, are available. These laboratories represent a focal point for the animal disease investigations of the Veterinary College, Ohio Agricultural Experiment Station, and the Department of Agriculture of Ohio.

The work of the department is of interest primarily to advanced and graduate students, but information regarding various projects under study is available to other courses presented by the College.

The facilities of the department provide ample opportunities for the interested and able veterinary student to pursue a variety of studies under the direction of the staff.

950. Veterinary Research. Autumn, Winter, and Spring Quarters. General prerequisites must include satisfactory evidence of an interest in and ability to pursue the projects undertaken.

This course is designed to accommodate the needs in different lines of veterinary research. The work will be outlined by the instructor to meet the requirements of the individual student.

While research primarily in the fields of infectious, parasitic, and nutritional diseases is

under the supervision of the staff members, Dr. Edgington, Dr. Rebrassier, and Dr. Schalk, other lines of study may be arranged under appropriate leadership. A close working relationship is maintained by the entire staff on all problems under consideration in the department.

VETERINARY SURGERY
Office, 115 Veterinary Clinic

PROFESSORS GUARD, DONHAM, AND SHOEMAKER (EMERITUS), ASSISTANT PROFESSOR KRILL, MR. KNAPP, MR. NICHOLS

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

624. Special Problems in Veterinary Surgery. One to five credit hours. Each Quarter. Autumn, Winter, Spring. Mr. Guard, Mr. Knapp, Mr. Nichols.
Advanced work in surgery or sterility.

VOCATIONAL EDUCATION
(See Education)

ZOOLOGY AND ENTOMOLOGY
Office, 101 Botany and Zoology Building

PROFESSORS OSBURN, OSBORN (EMERITUS), BARROWS, DeLONG, PETERSON, KENNEDY, AND SNYDER, ASSOCIATE PROFESSORS D. F. MILLER, PRICE, AND CAMPBELL, ASSISTANT PROFESSORS KOSTIR, J. A. MILLER, HICKS, DAVIDSON, RIFE, DUNHAM, AND KNULL, MR. J. N. MILLER, MR. COTTERMAN, MR. VENARD

ZOOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

Requirements for Advanced Degrees: In addition to the fixed requirements of the University, the Department of Zoology and Entomology requires that the candidate for the Master's degree shall have had, at the time of the comprehensive examination, fundamental training in the following subjects: organic or biological or agricultural chemistry, botany and any three of the following groups: anatomy or vertebrate zoology, invertebrate zoology, embryology, or genetics, plant or animal physiology, plant pathology or bacteriology. Additional requirements in the special field in which the degree is taken will be indicated by the adviser. The candidate for the Doctor's degree, in addition to the fixed requirements of the University and all of the groups indicated above, shall have had at the time of the comprehensive examination, a fundamental knowledge of the following subjects: college algebra and statistics, physics, ecology and geology or evolution, besides familiarity with the current literature. Additional requirements in the special field of research will be indicated by the adviser.

601. Advanced Human Heredity. Three credit hours. Winter Quarter. Three lecture-discussion periods each week. General prerequisites must include a course in principles of heredity and permission of the instructor must be obtained. Mr. Snyder.
This is largely a study of human inheritance, with especial emphasis on the methods of research in this branch of genetics. The mathematical analysis of human pedigrees is intensively studied.

†602. Advanced Genetics. Three credit hours. Autumn Quarter. Three lecture-discussion periods each week. General prerequisites must include a course in principles of heredity and permission of the instructor. Mr. Rife.
A study of recent advances in genetics, with special reference to chromosomal aberrations. The interaction of heredity and environment in man is discussed particularly from the standpoint of the study of twins.

† Not given during the academic year, 1940-1941.

†605. **Animal Behavior.** Three credit hours. Autumn Quarter. One lecture each week, the remainder laboratory work. Given in alternate years. Permission of the instructor is required. Mr. Barrows.

This course is devoted to the study of the functions of the various parts of the nervous system of the invertebrates, with emphasis on the mechanics of adjustment to heat, light, chemical, and mechanical stimuation. Considerable time will be spent on experiments with living worms and insects.

606. **Animal Behavior.** Three credit hours. Winter Quarter. One lecture each week, the remainder laboratory work. Permission of the instructor is required. Given in alternate years. Mr. D. F. Miller.

This course is devoted to the study of the responses of insects to the stimulating factors of their environment. These studies are directed toward the types of behavior which are important in insect control.

609. **Animal Microtechnic.** Three or five credit hours. Autumn Quarter. A laboratory course. Laboratory work, assigned readings, and conferences. This course is designed for students intending to major in one of the biological sciences. The class is limited to twelve students and permission of the instructor must be obtained before registering for the course. Mr. Kostir, Mr. J. N. Miller.

Theory and practice of microscopic methods, including fixing, embedding, sectioning, and staining of animal tissues, making permanent preparations, and special manipulation of the microscope and its accessories.

610. **Animal Parasites.** Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. Mr. J. N. Miller.

This course covers the general principles of parasitology, the morphology, life history, and classification of parasites, and their host relationships. Recommended for students preparing for medical or zoological work.

617. **Cellular Biology I.** Three or five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Permission of the instructor must be obtained before registering for this course. Mr. Kostir.

A study of the organization of living cells and the fundamental phenomena of life.

618. **Cellular Biology II.** Three or five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. General prerequisites must include a course in heredity. Zoology 617 is desirable, but not essential. Permission of the instructor must be obtained before registering for this course. Mr. Kostir.

A study of the physical basis of heredity, variation, and evolution.

620. **Advanced Zoology of Vertebrates.** Five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. A course in evolution and one Quarter in comparative anatomy are also desirable. Mr. Price.

A study of the various vertebrate groups, emphasizing their origin, phylogeny, classification, life histories, habits, distribution, and economic importance. Laboratory, museum and field work. Especially recommended for students specializing in biological science.

625. **Advanced Zoology of Invertebrates I. The Protozoa.** Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. Mr. Kostir.

Zoology 625, 626, and 627 are fundamental courses designed to give the student a general knowledge of the structure, life histories, habits, and relationships of the invertebrate animals. While it is preferable that these courses be taken in the order given, this is not essential, and any one of the three may be elected independently of the others. Course 625 deals with the protozoa, including both free-living and parasitic forms.

626. **Advanced Zoology of Invertebrates II.** Five credit hours. Winter Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. Mr. Kostir.

A study of the structure, life histories, habits and relationships of sponges, coelenterates, worms, and arthropods, together with the consideration of important biological principles illustrated by these groups. Note statement under Zoology 625.

† Not given during the academic year, 1940-1941.

627. Advanced Zoology of Invertebrates III. Five credit hours. Spring Quarter. Two lectures and three two-hour laboratory periods each week. General prerequisites must include elementary courses in zoology. Mr. Kostir.

A study of the structure, life histories, habits and relationships of molluscs, echinoderms, brachiopods, and bryozoa, together with the consideration of important biological principles illustrated by these groups. Note statement under Zoology 625.

630. The Interpretation of Biological Data. Five credit hours. Winter Quarter. Three lectures and two two-hour laboratory periods each week. Permission of instructor must be obtained before registering for this course. Mr. Cotterman.

A study of biological variability, methods of classification and analysis, based on biometrical usage. The methods of collecting and assembling data and the consideration of their biological validity will be stressed.

640. Wildlife Conservation. Five credit hours. Winter Quarter. Five lectures each week. General prerequisites must include thirty hours of biological sciences, and permission of the instructor must be obtained. Mr. Hicks.

An introduction to the field of wildlife conservation. Value of wildlife resources, relation to other natural resources, agriculture, forestry and recreation, wildlife economics, land utilization contributions, conservatism fundamentals, research and field techniques, ecology of game and non-game species, role of vegetation in habitat developments, interrelationships of species, management methods, demonstrations, utilization, administration, education and public relations, history of wildlife conservation, wildlife conservation organizations or institutions, and personnel entrusted with custody of wildlife resources today.

643-644-645. Wildlife Conservation Conference. One credit hour. Autumn, Winter, and Spring Quarters. General prerequisites must include thirty hours of biological science and permission of instructor must be obtained. Mr. Hicks.

Review of research, discussion of assigned subjects, problems encountered, research methods, current literature, etc. Reports on subjects related to wildlife conservation by staff members of various departments and addresses by visiting wildlife technicians, research workers, educators, and administrators.

701. Special Problems. Three or five credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include satisfactory preparation for individual work in the field of the chosen problem. The student may have free choice of the instructor under whom he desires to work, but the permission of the instructor must be obtained before registering for the course. The staff.

NOTE: TEACHING COURSES. For the Teaching Course in this department see the Department of Education, Course 683.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

These prerequisites include an adequate knowledge not only of zoology but also of related sciences. It is desirable that the student should have a reading knowledge of French and German.

801-802-803. Seminar in Zoology. One credit hour. Autumn, Winter, and Spring Quarters. Mr. Osburn, Mr. Price, Mr. Barrows.

Discussion of assigned subjects, reports on research work, current literature, etc. All graduate students in the department are expected to register in this course as long as they are in residence.

805-806-807. Invertebrate Zoology. Five credit hours. Autumn, Winter, and Spring Quarters. Mr. Osburn.

A detailed study of invertebrate groups with special reference to morphologic features and discussions of their significance in adaptation, phylogeny, and taxonomy.

808. Comparative Embryology. Five credit hours. Autumn Quarter. Three lectures and two two-hour laboratory periods each week. Open to graduate students with the consent of the instructor. Mr. Price.

A survey of various modes of embryonic development, illustrated with both invertebrate and

vertebrate types. Emphasis is placed on fundamental aspects and processes of development. Both descriptive and experimental methods will be used in the laboratory work.

810. Research Methods: General. Five credit hours. Winter Quarter. Three lectures and two laboratory periods each week. Open to graduate students with the consent of the instructor. Mr. D. F. Miller.

Designed for students interested in research in experimental biology. It deals with the technics and the methods of attacking problems of research and with the principal types of apparatus and devices that may be used in experimentation. Particular emphasis is placed upon the analysis and control of such factors as spectral energy radiations, moisture and humidity, air, food, gravity, etc. Some time will be devoted also to the manner of accumulating data, its organization and its expression for presentation in reports and publication. The emphasis may be shifted at times to suit the needs of the class.

950. Research in Zoology. Autumn, Winter, and Spring Quarters. Mr. Osburn, Mr. Barrows, Mr. DeLong, Mr. Peterson, Mr. Kennedy, Mr. Kostir, Mr. Snyder, Mr. Price, Mr. D. F. Miller, Mr. J. A. Miller.

Problems in development, life history, morphology, ecology, genetics, animal behavior, parasitology, taxonomy, or other zoological or entomological subjects may be undertaken. For some of these the opportunities are particularly good in summer at the Biological Laboratory. Students interested should send for the Franz Theodore Stone Laboratory Bulletin.

ENTOMOLOGY

FOR ADVANCED UNDERGRADUATES AND GRADUATES

600 and 700 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION," page 40.

651-652. Advanced Entomology. Five credit hours. Autumn and Winter Quarters. Two lectures and three two-hour laboratory periods each week. Mr. Kennedy.

Advanced entomology for those wishing to investigate some special group of insects or to fit themselves for professional work in entomology.

Entomology 651 deals with the comparative external morphology, the evolutionary history and classification of insects; laboratory work is systematic and material will be furnished, but it will be preferable if the student collects and pins material for himself during the summer preceding.

Entomology 652 deals with insect behavior, life histories, and particularly with ecological principles governing occurrence and distribution of insect species, and the principles underlying insect control. The laboratory work is systematic. The two Quarters cover all the insect orders.

653-654. Chemical Control of Insect Pests. Five credit hours. Autumn and Spring Quarters. Two lectures and two three-hour laboratory periods each week. General prerequisites include elementary courses in zoology and in general and economic entomology, or equivalent. A background of training in physics and quantitative chemistry is desirable. Mr. Campbell.

These courses deal with materials and methods used for the control of insect pests. Insecticides used for plant protection are studied in Entomology 653; insecticides for the protection of man, animals, and stored products in Entomology 654.

655. Insects in Relation to Disease. Three or five credit hours. Winter Quarter. Three lectures each week. Students who register for five credit hours will have two two-hour laboratory periods in addition. General prerequisites must include introductory courses in zoology, also it is advisable to have had beginning courses in entomology, bacteriology, and animal parasites. Mr. Venard.

This course gives students in animal husbandry, bacteriology, medicine, veterinary science, and others an opportunity to become familiar with the recognition characteristics, habits, and controls of immature and adult insects, ticks, mites, and other arthropods that attack man and domestic animals. Considerable attention is paid to those species that transmit various diseases of man and animals. Especially recommended for premedical students.

658. Insect Ecology. Five credit hours. Autumn Quarter. Three lectures and two two-hour laboratory periods each week. Mr. DeLong.

A study of the environmental factors under which insects live and their relationship to the production of insect populations and control phases. This involves the study of climate, the relationship of temperature, humidity, precipitation, and evaporation to biology of insects, the

problems of hibernation, aestivation, and such applied problems as the effect of cropping, rotation, and cultivation upon the development of insect populations.

660. Entomological Literature and Principles of Taxonomy. Five credit hours. Winter Quarter. Given in alternate years. Mr. Kennedy.

Lectures on the development of entomological writing, studies of Government and Experiment Station bulletins and other publications, assigned readings, and preparation by each student of a report or review upon some publication. Intended to familiarize the student with past and current publications and give him command of the published records in his field of study.

A study of the principles of classification with lectures on taxonomic systems, codes of nomenclature, etc. Practical work in the classification of a selected group or groups of insects or other animals.

662. Household Insects. Three credit hours. Spring Quarter. Two lectures and one two-hour laboratory period each week. Mr. Campbell.

A study of the characteristics, biology, and control of insects that annoy man or damage his buildings or goods therein. The course is also intended to acquaint the students with present practices and future possibilities of the pest control industry. Field trips will be made to observe the work of local pest control operators.

Not open to students who have credit for Entomology 562.

665. Immature Insects. Three or five credit hours. Spring Quarter. One lecture and two or four two-hour laboratory periods each week. General prerequisites must include Entomology 651 and 652 or equivalents. Mr. Peterson.

This course will give a student an opportunity to become familiar with families, genera and species of insects in their immature stages. The laboratory work will deal primarily with the determination of eggs, larvae and pupae of insects having complete metamorphosis. Library and field work will also be included. Topics such as external morphology and methods of collecting, rearing, preparation and materials, etc., will be discussed.

666. Horticultural Entomology. Five credit hours. Spring Quarter. Three lectures and two two-hour laboratory periods each week. Mr. Davidson.

Designed for students specializing in the department of Horticulture.

A study of the characteristics, biology, ecology, and control of the insect pests attacking ornamental shade trees and shrubs; orchards and small fruits; and vegetable and greenhouse crops. Field and laboratory studies will be made on recognition of types of injury, the stages of the insect causing it, and the preparation and application of the proper remedial measures.

701. Special Problems. Three to five credit hours each Quarter. Autumn, Winter, Spring. A student may enter at the beginning of any Quarter. General prerequisites must include satisfactory preparation for individual work in the field of the chosen problem. The student may have free choice of the instructor under whom he desires to work, but the permission of the instructor must be obtained before registering for the course. The staff.

FOR GRADUATES

800 and 900 Courses. A statement of the general prerequisites for all courses in this group will be found immediately following the heading, "DEPARTMENTS OF INSTRUCTION." page 40.

801-802-803. Seminar in Entomology. One credit hour. Autumn, Winter, and Spring Quarters. Mr. Peterson, Mr. Kennedy, Mr. Campbell, Mr. DeLong, Mr. Davidson.

Discussion of assigned subjects, reports on research work, current literature, etc. All graduate students in the department are expected to register in this course as long as they are in residence.

814-815. Biological Control of Insect Pests. Five credit hours. Autumn and Winter Quarters. Three lectures and two two-hour laboratory periods each week. Each Quarter is a unit in itself and may be taken independently of the other. Open to graduate students in entomology with the consent of the instructor. Mr. Peterson.

An advanced course dealing with the biological agents which bring about a balance or control among insects. During the Autumn Quarter diseases of insects, chiefly bacterial and fungous, and vertebrate and invertebrate predators of insects will be considered. During the Winter Quarter parasites of insects, chiefly parasitic insects, will be considered. The laboratory work will consist largely of special assigned problems.

816. Research Methods: Living Insects. Five credit hours. Spring Quarter. Three lecture hours and two two-hour laboratory periods each week. Open to graduate students with the consent of the instructor. It is advisable to have Zoology 810 previous to this course. Mr. Peterson.

A course designed for the purpose of introducing students to methods and equipment employed today by research entomologists in their ecological studies of living insects. Particular attention will be paid to methods of measuring environmental factors in the field, methods of conducting life history studies, trapping insects, sampling and estimating insect populations and other useful information for entomologists now in or preparing to enter field research work. The laboratory will consist largely of special assigned problems.

817. Morphology and Development of Insects. Five credit hours. Autumn Quarter. Two lectures and three two-hour laboratory periods each week. Mr. Kennedy.

An advanced comprehensive course on the internal structures of insects, together with what is known of their functions, morphology, histology, embryology, and metamorphosis. The laboratory is handled as an individual research problem for each student and may be continued in succeeding Quarters as research.

The success of this work depends on the material collected and preserved by the student preceding the course. Methods for collecting and preserving material should be taken up with the instructor in charge at the end of the Spring Quarter preceding. Students coming from other institutions are expected to write for instructions.

850. Insect Physiology. Five credit hours. Winter Quarter. Two lectures and two three-hour laboratory periods each week. The instructor must be consulted before registering. Mr. Campbell.

This course will be confined to quantitative aspects of insect physiology, dealing chiefly with the results of laboratory investigations on the chemistry of insect structures, body contents, and products, and on digestion, blood excretion, respiration, nutrition, and growth. The relations of insect physiology to the chemical control of insects will be stressed.

950. Research in Entomology. Autumn, Winter, and Spring Quarters. Mr. Osburn, Mr. Barrows, Mr. Peterson, Mr. DeLong, Mr. Kennedy, Mr. D. F. Miller, Mr. Campbell, Mr. Davidson.

Problems in development, life history, morphology, ecology, genetics, animal behavior, parasitology, taxonomy, or other zoological or entomological subjects may be undertaken. For some of these the opportunities are particularly good in summer at the Biological Laboratory. Students interested should send for the Franz Theodore Stone Laboratory Bulletin.

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General Catalogue Number*

Information for Prospective Students

Summer Quarter

Time Schedule

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Short Courses in Agriculture

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